FEBRUARY 1977 75 CENTS

Popular Mechanics

10 solar-powered gadgets that are fun to own

CHEF's KNIVES: How to make a superb set for your kitchen

COMING: DAZZLING NEW SPACE PROBES

We drive AMC's new 30-MPG GREMLIN

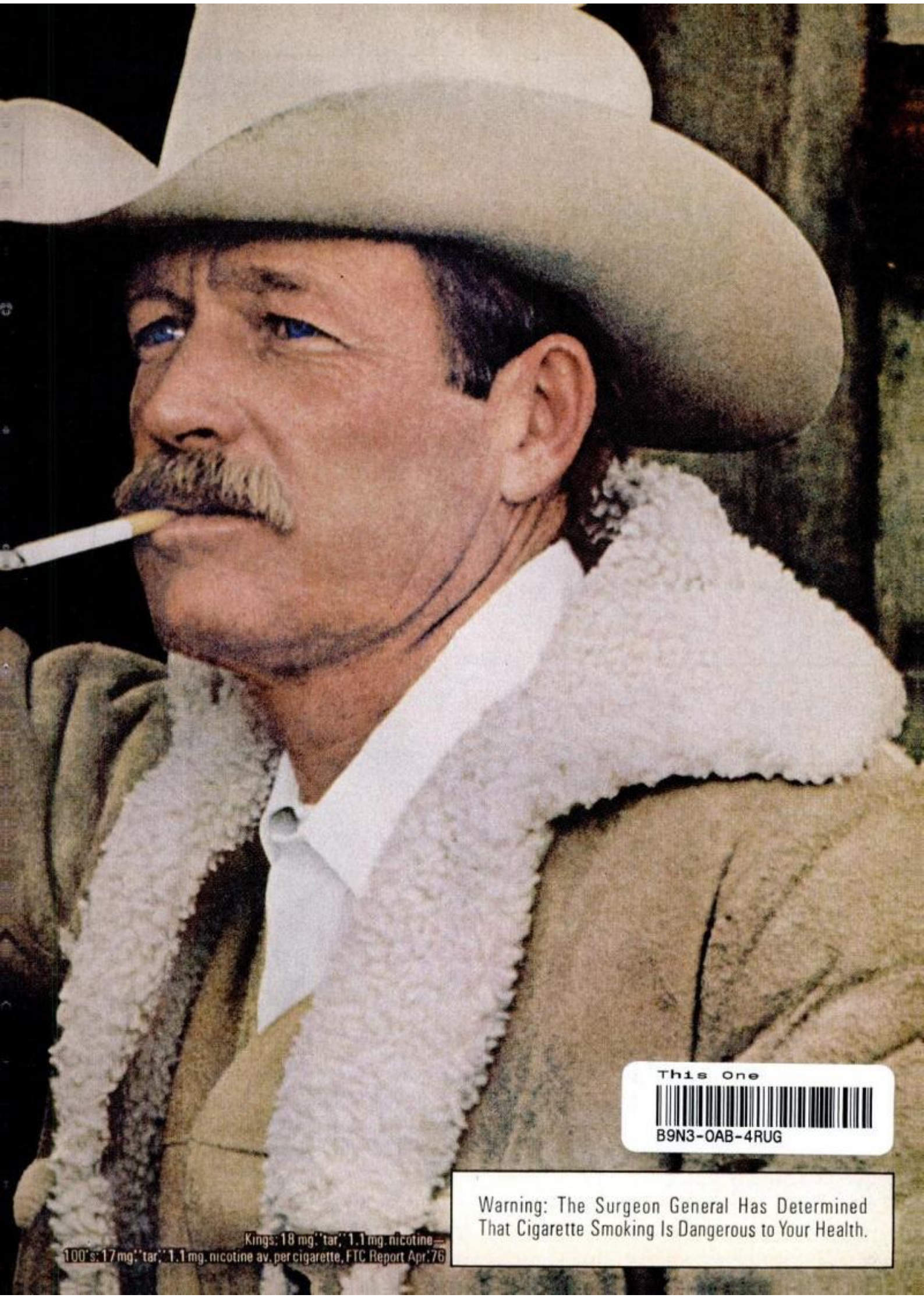
HOME-BUILT COMPUTERS: PM tests 16 top kits

6 EXCITING SPORTS PLANES YOU CAN BUILD

10 quick fixes for a faltering furnace

PLUS: 23 amplifier kits... New boats... & more!

Материал, защищенный авторским правом


This One
B9N3-0AB-4RUG
Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.
Kings: 18 mg. "tar," 1.1 mg. nicotine—
100's: 17 mg. "tar," 1.1 mg. nicotine av. per cigarette, FTC Report Apr.'76

Popular Mechanics®

On the cover
From plans for the original two-place open Pietenpol, one builder "tricked up" his plane to look like a WW1 fighter complete with dummy bomb. For a look at some new and colorful aircraft you can build from plans or kits, see pages 72-73.
Photo: Howard Levy

FEBRUARY 1977 CONTENTS VOLUME 147 NUMBER 2

INTERNATIONAL EDITIONS: AUSTRALIA, CARIBBEAN, MEXICO, SOUTHERN HEMISPHERE

Special features:

Chef's knives: You can make a fine set
PM's grid plans, pictures show you how to create fine cutlery step by step **108**

Coming: Dazzling new space probes for 1980s
Fuel-less space sails, radar mapper for Venus and Mars rover figure in way-out plans **67**

Driving AMC's new 30-mpg Gremlin
Lightweight Four boosts handling and economy; reduces noise, vibration **87**

Home-built computers
PM's test of 16 kits finds them good for many tasks besides work with numbers **98**

Solar-energy gadgets
Many new small-scale devices are very cheap **112**

10 quick fixes for a faltering furnace
Know-how to correct minor problems could save you a cold night and service call **104**

Automobiles and bikes
24 Your motorcycle: How to body English your bike and be a better rider
37 Imports and Motorsports
43 The PM Garage
44 Detroit Listening Post
55 Car Clinic
78 Hot dogging it in the bullring
87 Driving the new 30-mpg Gremlin
88 PM Owners Report: Oldsmobile Cutlass
102 Saturday Mechanic: How to stop hesitation
177 Car insurance: How your rates are set

Electronics, radio, TV
38E Direct-drive turntable changes records, too
82 Amplifier kits: Good sound, built-in savings
98 Home computer kits: The hottest new angle in America's newest hobby
175 12-v. power supply for car stereo or mobile CB

Home and yard
16 Appliance Clinic
34 Homeowners' Clinic
104 Furnace fix-ups that save fuel and money
122 Easy-to-build garage space-saver

Aviation
72 They fly what they build
84 The chopper they call when the chips are down
170 It's a plane, glider . . . both
192 3 control-line fighters

Every month
12 Letters
38A, 77, 190 It's New Now

Boating, outdoors
52 All Outdoors
90 Boating '77
90 Eleven boats that are tops afloat
94 Best new gear for skippers
96 How to take the world's outboard championship
101 Fit out for making money

Shop and crafts
38B A smart thermostat you build from a kit
38F The art of making briar pipes
46 PM Workbench
60 Benchtop vise for tricky holds
115 Complete guide to furniture refinishing
108 Chef's knives you make
118 Build a loom for weaving fun
124 Tool test: Dewalt's power miterbox
156, 174, 187, 188 Hints From readers
184 Make rustic picture frames from barn siding

Science and engineering
14 Science Worldwide
67 Sailing with Halley's Comet—and other space spectaculars of the 1980s
112 Ten solar-powered gadgets

Photography
23 Photo hints
74 Shooting wildlife—with a camera

Worth writing for
Looking for more ideas and information? See page 214.

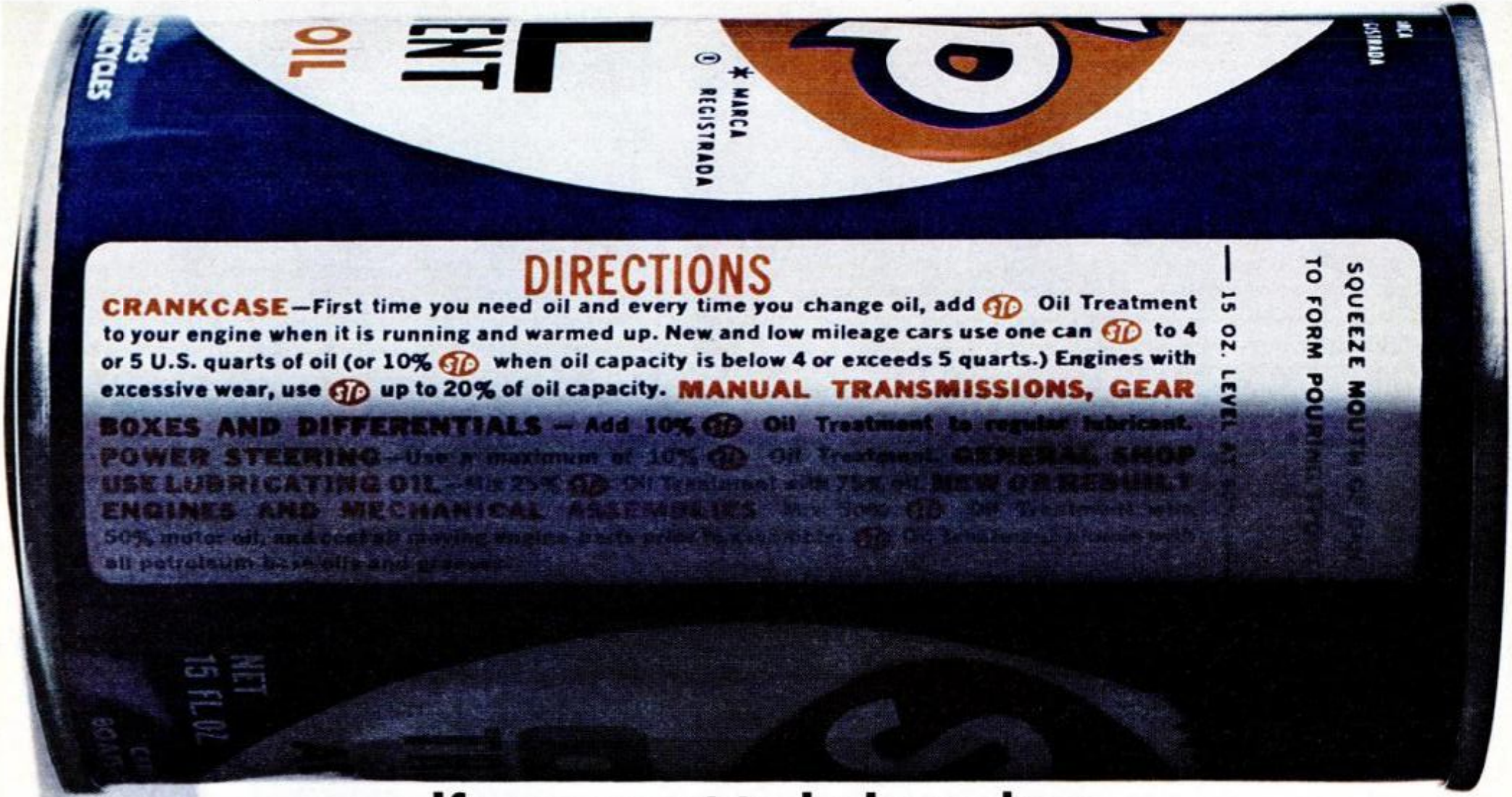
AS A SERVICE TO READERS. *Popular Mechanics* publishes newsworthy products, techniques and scientific and technological developments. Due to possible variance in the quality and condition of materials and workmanship, *Popular Mechanics* cannot assume responsibility for proper application of techniques or proper and safe functioning of manufactured products or reader-built projects resulting from plans published in this magazine.

POPULAR MECHANICS IS PUBLISHED MONTHLY by The Hearst Corporation, 224 West 57th Street, New York, N.Y. 10019, U.S.A. Single copy for the United States, 75 cents; for Canada, 95 cents. Subscription prices: United States and Possessions, $7.00 for one year; $13.00 for two years; $18.00 for three years. Canada and all other countries, add $6.00 for each year. Second-class postage paid at New York, N.Y., and at additional mailing offices. Authorized as second-class mail by the Post Office Department, Ottawa, and for payment of postage in cash. Registered as second-class matter at the Post Office at Mexico D.F., Mexico, June 20, 1950.
© 1977 by The Hearst Corporation. All rights reserved. Printed in U.S.A.

POSTMASTER: Please send Forms 3579 to Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50340.

SUBSCRIPTION SERVICE: Popular Mechanics Magazine will, upon receipt from its reader of a complete new or renewal subscription order, undertake fulfillment of that order so as to provide the first-copy delivery to the Postal Service within six to twelve weeks. If for some reason this cannot be done, you will be promptly notified of the issue date that will begin your subscription, with a request for any further instructions you may have concerning your order. Please address all such orders to us at Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50340. ■ Should you have any problem with your subscription, please write to John Harris, Customer Service Department, Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50340. To assure quickest service, please enclose your mailing label when writing to us or renewing your subscription. ■ Renewal orders must be received at least eight weeks prior to expiration to assure continued service.

Материал, защищенный авторским правом



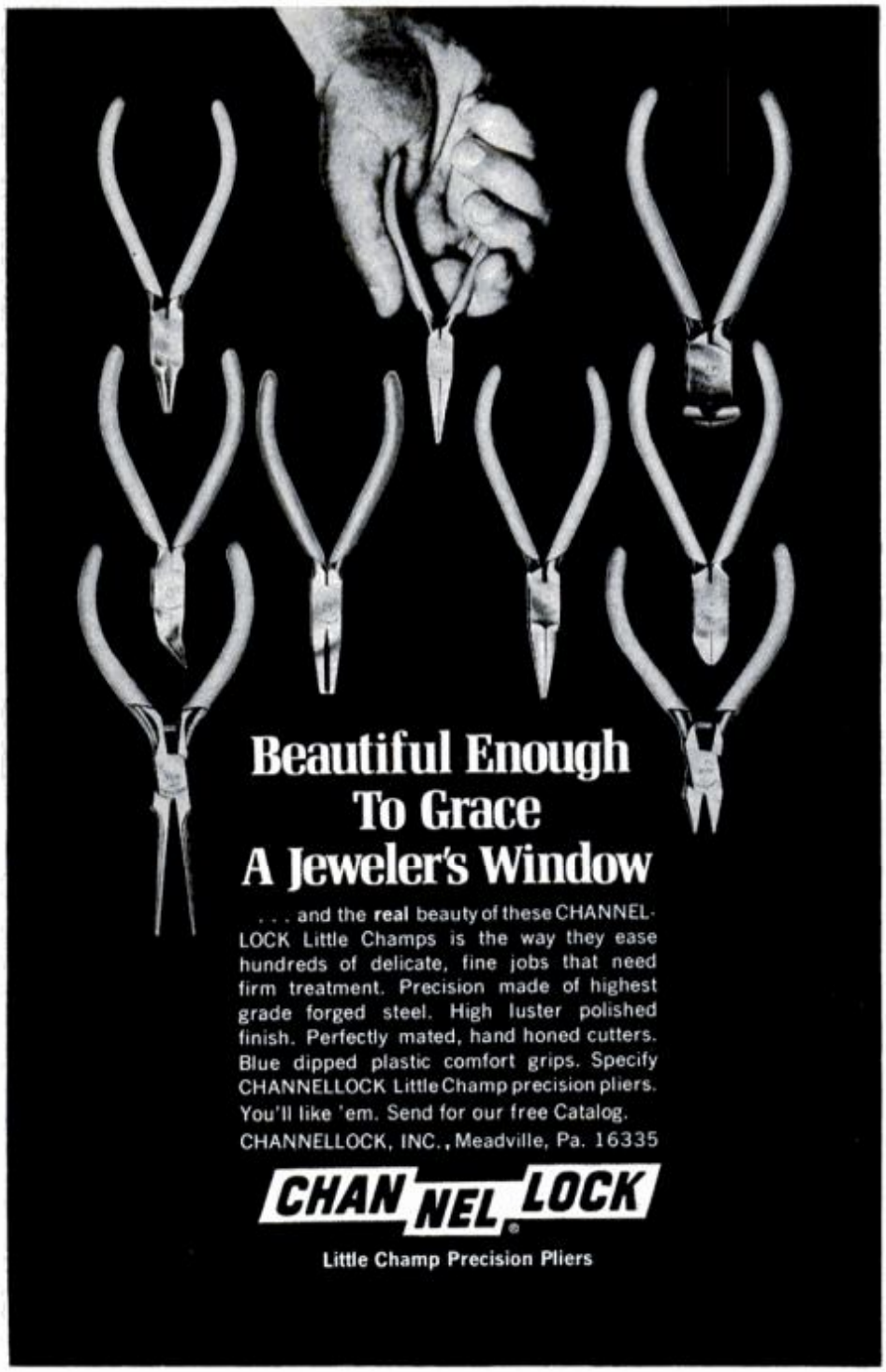
If you want to help reduce engine wear and oil consumption, follow the simple directions.

Use STP Oil Treatment at every oil change and the first time you need oil and you'll be taking a helpful step toward reducing engine wear and oil consumption in your car.

STP's effectiveness was confirmed in a series of tests conducted by Automotive Research Associates, Inc. in 27 cars driven over half a million miles. In those tests it was clearly shown that STP Oil Treatment helps reduce engine wear, and oil consumption, too. That's because STP fortifies and toughens oil . . . even a premium 10W-40 to help reduce the wear rate of lubricated parts in an automobile engine.

And if you'd like to know what's in STP Oil Treatment and how it works you can read about it, plus detailed test results, in a free booklet available from STP.* But while that takes four pages to explain, the directions are simple enough to fit on the side of the can. And if you want the security of knowing that you're helping your engine live a longer life, that's the next thing you really ought to read.

*For your free booklet, write to: STP Corp., 1400 W. Commercial Blvd., Ft. Lauderdale, Fla. 33310.



Build a solar heater and cut your fuel bills up to 90%

It's easy—this new book shows you how

How to build a Solar Heater
By Ted Lucas
author, physicist, solar energy consultant

Forget rising fuel costs! If you have ordinary mechanical skills, you can tap the sun for FREE ENERGY to heat your home, building, trailer or pool. Easy-to-follow text, photos, drawings and charts take you every step of the way. Materials are inexpensive, easy to obtain – sheet metal, wooden frame, glass cover, simple piping, black paint. The nation's most comprehensive and up-to-date guide to building and buying solar panels, heaters, barbecues, power plants. For handyman or contractor. Turn on the sun – turn high fuel bills off!

For each book, send $4.95 plus 35¢ for postage and handling. California residents add 6% sales tax. Send to: Ward Ritchie Press, 474 South Arroyo Parkway, Pasadena, Calif. 91105

Name _____
(Please Print)
Address _____
City _____ State _____ Zip _____

Popular Mechanics®

JOHN A. LINKLETTER
Editor
SHELDON M. GALLAGER
Executive Editor
DANIEL C. FALES
Managing Editor
WAYNE C. LECKEY
Senior Editor, Special Projects
ALVIN KIETZ
Art Director

BILL HARTFORD
Automotive
JOHN F. PEARSON
Science and Engineering
WM. T. McKEOWN
Boating, Outdoors and Travel
IVAN BERGER
Electronics and Photography
MICHAEL S. McCLINTOCK
Home and Shop
PENELOPE ANGELL
Assistant, Home and Shop
MICHAEL LAMM
West Coast
ROBERT LUND
Detroit Automotive
GARRY WINTER
Copy Chief
JOHN BOSTONIAN JR.
Production
SHARI E. GREEN
Assistant, Production
IRA HERRICK
Associate Art Director
DON MANNES
Technical Art Director
DAVID KOMITAU
Assistant Art Director
ED MENTKEN
Assistant Art Director
CLIFFORD B. HICKS
Special Publications
SOPHIE GRONOWICZ
Director, Bureau of Information
EVERETT JOHNSON
Cabinetmaker

DANIEL J. COLEMAN
Director of Advertising

ADVERTISING OFFICES: New York: 224 W. 57th St., (212) 262-4282; Chicago: 520 N. Michigan Ave., (312) 527-2400; Detroit: General Motors Bldg., (313) TRinity 5-8711; Cleveland: 20310 Chagrin Blvd., Shaker Heights, Ohio, (216) 283-7788; Los Angeles: 601 N. Vermont Ave., (213) 666-6263.

JOHN A. REGINA
Advertising Production Manager

Published by The Hearst Corporation
JOHN R. MILLER
President
RANDOLPH A. HEARST
Chairman
FRANK A. BENNACK JR.
Executive Vice President
RICHARD E. DEEMS
President, Magazines Division
GILBERT C. MAURER
Executive Vice President, Magazines Div.
JOSEPH F. KERN
Publisher

POPULAR MECHANICS IS PUBLISHED MONTHLY by the Hearst Corporation, 224 West 57th Street, New York, N.Y. 10019, U.S.A., John R. Miller, President; Randolph A. Hearst, Chairman; Harrison A. Mitnick, Treasurer; Harvey L. Lipton, Vice President and Secretary. Hearst Magazines Division: Richard E. Deems, President; Gilbert C. Maurer, Executive Vice President; Raymond J. Peterson, Executive Vice President, Advertising; William S. Campbell, Vice President and General Manager; John F. D'Avolio, Vice President and Resident Controller; Albert A. Rachoi, Vice President and Director of Circulation; Joseph F. Kern, Vice President for Popular Mechanics.

ADDRESS ALL EDITORIAL COMMUNICATIONS to 224 West 57th St., New York, N.Y. 10019. For additional sources of information on the articles and products in this issue, write to the Bureau of Information, Popular Mechanics, for free "Where-to-Find-It" list.

Материал, защищенный авторским правом

Walls that live up to the way a kid lives. That's the beauty of Masonite.

Brand Paneling

Nobody is harder on walls than kids. That's why nothing is better on kids' walls than Masonite brand paneling. It's more than beautiful, it's tough. And it wipes clean with a damp cloth.

Look for this Earthwood design paneling and many others at your Masonite dealer. It's a practical way to make a beautiful room for your kids.

Man-made finish on real Masonite brand hardboard.

MASONITE CORPORATION

Room design by Larry Deutsch, A.S

Материал, защищенный авторским правом

It's a fact that the people who first put radio on wheels also made the first radio on wheels on the moon.

But it's not surprising.

Because Motorola® makes more radios for police, firemen, taxis, and lunar rovers than anybody.

And now Motorola makes a 40-Channel CB radio that shares much more than a name with our professional 2-way radios.

The clean, uncluttered lines of the Motorola CB, for instance.

e or lease of Motorola 40-channel CB radios is subject to FCC type acceptance.

Материал, защищенный авторским правом

Features that many manufacturers leave on the outside of their sets (or don't offer at all) are built into a Motorola CB.

Gain control, noise limiting, audio compression, even a TV interference filter are built-in, fully automatic circuits that actually make communications better.

And operation easier.

A digital phase lock loop synthesizer provides precise tuning (automatically, of course).

A professional-quality 3½-inch top-fire speaker gives the Motorola CB an audio quality that must be heard to be fully appreciated.

And every Motorola CB gives you the added advantage of a power mic that doesn't need batteries. That doesn't cost 50 bucks extra.

The Motorola 40-Channel CB radio.

We believe it's the most sensibly engineered CB radio on the market.

We believe it will deliver years of service at a level of performance few could match.

Put a Motorola CB radio under your dash and you'll believe, too.

Motorola CB

From the voice of experience in 2-way radio.

To find the dealer nearest you, write: Customer Relations Manager, Motorola, Inc., Automotive Products Division, 333 Northwest Ave., Northlake, Illinois 60164.

SIX GOOD JOBS FOR

Read what the U.S. Dept. of Labor* says about these growing career fields:

1. **Auto Mechanics.** For entry jobs, employers look for young persons with mechanical aptitude, and knowledge of automobiles. Generally, a driver's license is required. Courses in automobile repair offered by many high schools, vocational schools, and private trade schools are helpful. Employment is expected to increase because expansion of the driving age population, and consumer purchasing power will increase the number of automobiles.

2. **Accountants.** Demand for skilled accountants will rise as managers rely more on accounting information to make business decisions. Persons planning a career in accounting should have an aptitude for mathematics. Employers seek applicants who can handle responsibility and work with little supervision. Employment is expected to increase about as fast as the average for all occupations through the mid-1980's.

3. **Engineering and Science Technicians.** Industrial expansion and increasing complexity of modern technology underlie the anticipated increase in demand for technicians. Those interested in a career as a technician should have an aptitude for mathematics and science, and enjoy technical work. An ability to do detailed work with a high degree of accuracy is necessary; for design work, creative talent also is desirable. Employment opportunities are expected to be favorable through the mid-1980's.

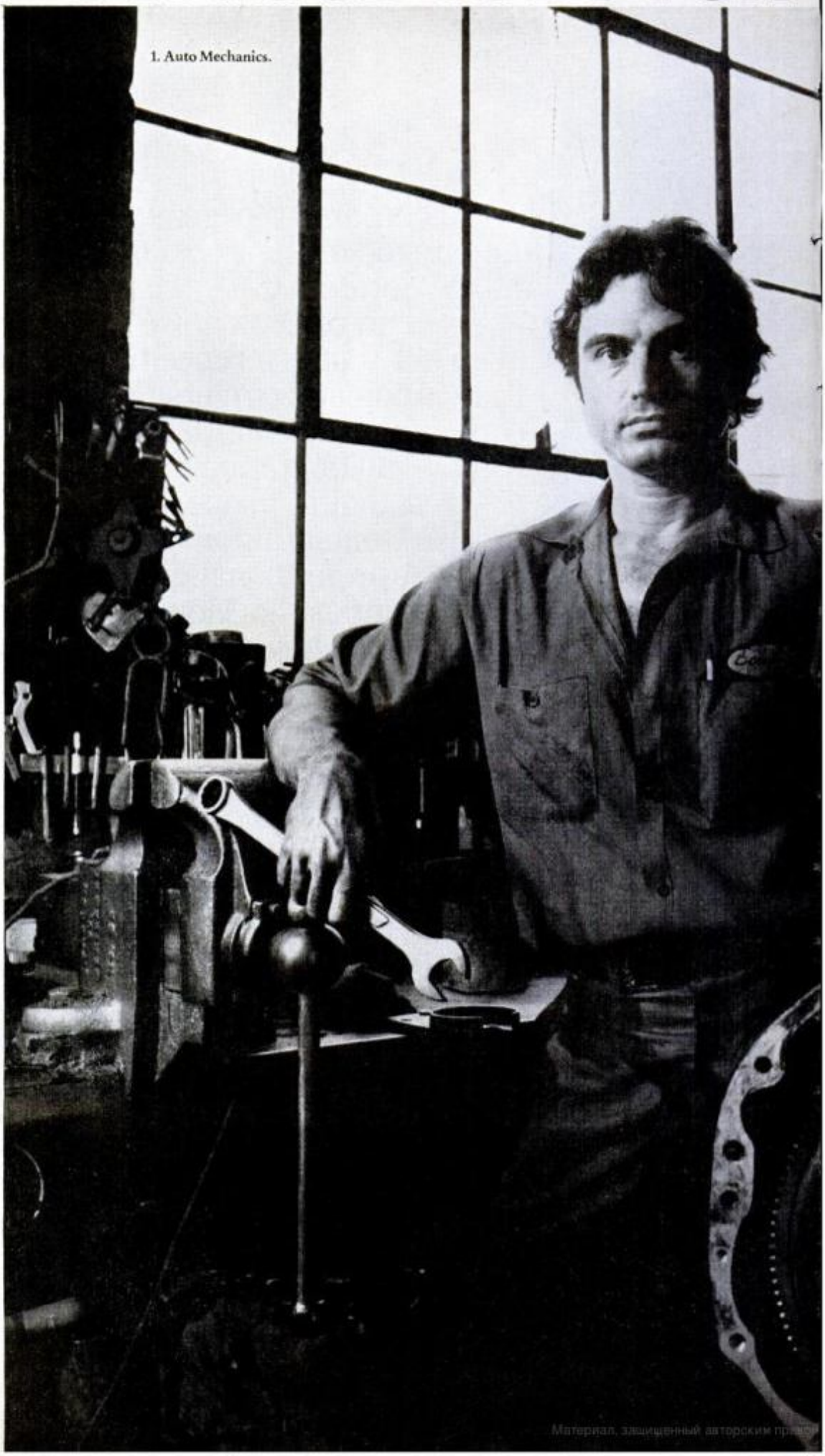
4. **Air-Conditioning, Refrigeration, and Heating Mechanics.** Increases in household formations and rising personal incomes should result in a very rapid increase in the number of air conditioned homes. Air-conditioning in schools, factories, and other buildings also is expected to increase. Employers prefer high school graduates who have had courses in mathematics, physics, electronics and blue-print reading. Employment is expected to increase faster than the average for all occupations through the mid-1980's.

5. **Draftsmen.** Those planning careers in drafting should: be able to do detailed work requiring a high degree of accuracy; have good eyesight and eye-hand coordination because most of their work is done at the drawing board; be able to function as part of a team since they work directly with engineers, architects, and skilled workers; and be able to do free-hand drawings of three dimensional objects. Employment of drafters is expected to rise rapidly as a result of the increasingly complex design problems of modern products and processes.

6. **Electricians. (Construction and Maintenance)** Most training authorities recommend the completion of a 4-year apprenticeship program as the best way to learn the trade. Many helpers gain additional knowledge through trade school or correspondence courses. Although physical strength is not essential, manual dexterity, agility, and good health are. Employment of construction electricians and maintenance electricians is expected to increase faster than the average for all occupations through the mid-1980's. This growth will stem from increased use of electrical and electronic equipment by industry.

*Bureau of Labor Statistics, Occupational Outlook Handbook, 1976-77 edition.

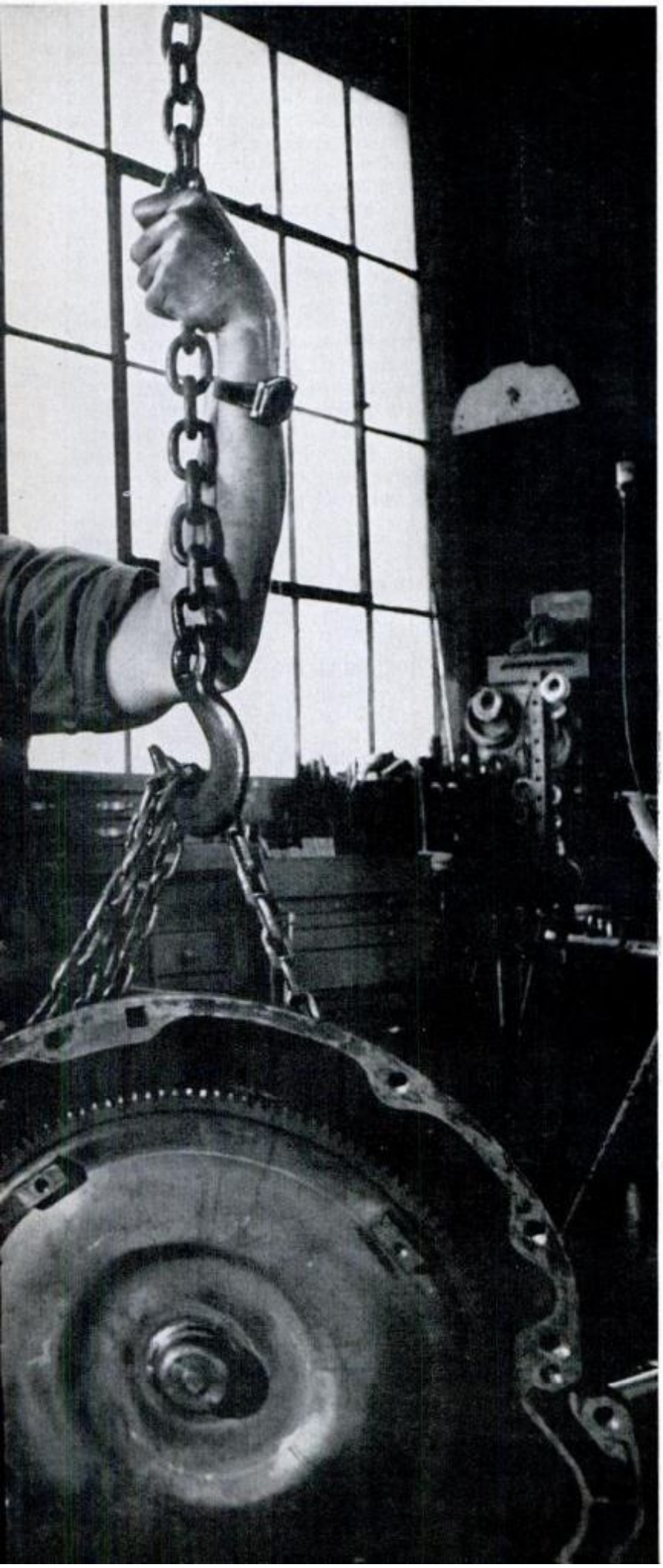
©1976 Intext, Inc. W



1. Auto Mechanics.

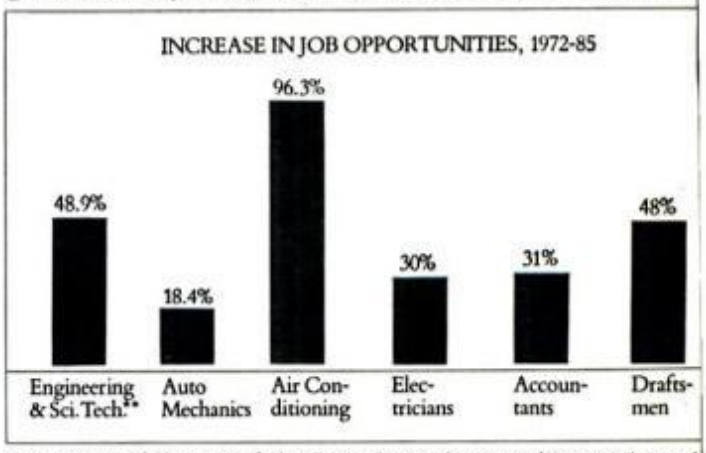
Материал, защищенный авторским правом

THE 70's & 80's



If you're looking for a new career, you should keep in mind that some job fields will grow faster than others over the next ten years. (Some, such as barbers, railroad workers, meat-cutters, etc., will actually decline.)

Why do we tell you this? We're ICS—International Correspondence Schools—and we offer career training in fields t government experts say are likely to increase over the next decac



Source: U.S. Dept. of Labor, Bureau of Labor Statistics, *Occupational Manpower and Training Needs*, Revised
**This category includes electronics and a variety of engineering fields available through ICS, as well as v technical fields which ICS does not offer.

Of course, we can't guarantee you a job—no school can do that. But we can give you the first-rate training you need, espe cially if you're interested in one of the growing career fields wher ICS concentrates its training.

You could even earn a degree without going to college. The ICS Center for Degree Studies is authorized by the Pennsylvar Department of Education to grant the Associate in Specialized Business degree in Accounting and Business Management, and the Associate in Specialized Technology degree in Civil, Mechanical, Electrical, and Chemical Engineering Technologies.

These degree programs are not mere stepping-stones to higher education nor are they primarily intended for transfer toward more advanced degrees. They are practical, career-oriente programs designed to help you reach your objectives without further academic training.

As an ICS student, you study at home, at your own pace But you're never alone. If you ever want to talk to an instructor, you can call ICS from anywhere in the continental United States c Canada, using our toll-free Dial-a-Question* service.

Since 1890, millions of men and women around the wor have turned to ICS for career training. More than 70 of America's largest 100 corporations (including Bethlehem Steel, 3M, Union Carbide, Weyerhaeuser, International Paper) use ICS training for their own employees.

No one can promise success, but if you *want* more—more money, more security, more day-to-day satisfaction and mor future—our free Career Booklet and free Demonstration Lesson can help you get started in the right direction. Just check the box next to the field that interests you most and mail the card or coupc today. There's no obligation.

ICS International Correspondence Schools, Scranton, Pa. 18515

Please mail me the Free Career Booklet and Free Demonstration Lesson for the field I have checked below. I understand I am under no obligation.

- ☐ Electrician
- ☐ Engineering
- ☐ Accounting
- ☐ Drafting
- ☐ Electronics Technician
- ☐ TV Service & Repair
- ☐ Surveying & Mapping
- ☐ Construction Electrician
- ☐ Diesel Mechanic
- ☐ Air Conditioning & Refrig.
- ☐ Automotive Mechanics
- ☐ Business Management
- ☐ Civil Engineering
- ☐ Interior Decorating
- ☐ Income Tax
- ☐ Motel/Restaurant Management
- ☐ Mechanical Engineering
- ☐ Appliance Servicing & Repair

ICS Center for Degree Studies
Associate in Specialized Business Degree in:
- ☐ Accounting
- ☐ Business Management

Associate in Specialized Technology Degree in Engineering Technologies
- ☐ Civil ☐ Electrical
- ☐ Mechanical ☐ Chemical

Name _____ Age _____

Address _____ City _____

State _____ Zip _____ Telephone _____

Veterans: Taken for career purposes, ICS Programs qualify for VA Benefits. XA1

Canadian residents use Scranton, Pa. address for service from ICS Canadian, Ltd.
In Hawaii: 931 University Ave., Honolulu, Hawaii 96814.

ал, защищенный авторским правом

LETTERS

TO THE EDITOR

Concerned about ripoff

How to End the CB Ripoff (page 92, Nov. '76) was most informative—but at the same time frightening. I say frightening because of the very fact that such an article is necessary. That CB radio thefts are so widespread is an indictment of our society's falling values. I am not comfortable knowing there are so many thieves out there waiting to steal my property. I'd rather see an article that would cure the thieves.

KEN GREENBERG
SKOKIE, ILL.

Model A comeback

Though the Model A Ford has been making its comeback for many a year (*Return of the Model A*, page 82, Nov. '76), it certainly is not being built again. As a restorer of the true Model A Ford, I can only consider the machine that Bill Kilpatrick writes about as an "amorphodite"—a very polite term that can be used in mixed company when describing either a very poor restoration or an assembled bunch of parts that resembles a Model A Ford. Every visible piece of equipment on Biebel's automobile, with the exception of the wheels and the radiator shell, is a reproduction.

As for Kilpatrick's greatest disservice to a great hobby, it is a rare Model A that sells for even half the price he quoted for a mint car. The problem encountered in attempting to buy the real thing is that it is hard to find an owner willing to part with his car at any price.

Irresponsible statements such as "collectors are paying a lot more than $12,500 for mint Model A roadsters" only serve to drive up the cost of restorable parts and cars to a point where this hobby can no longer be enjoyed by the average restorer. I can see where every farmer in Nebraska will think the pile of bones behind his barn is worth a fortune.

A Model A Ford is the real Model A, while Kevin Biebel's $12,500 plastic fantastic is something else.

ROBERT C. STRUBLE
OMAHA, NEB.

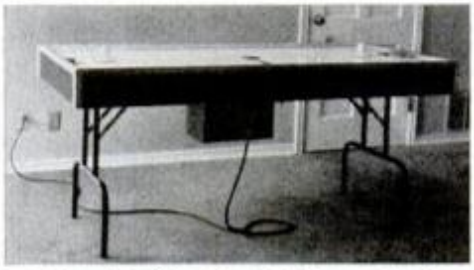
Author Kilpatrick replies: *If you bought new replacement parts for a Model A in, say, 1933, would you then deem the car in which you installed them a "reproduction"? Of course not.*

Regardless of when they were manufactured, Kevin Biebel has on hand enough original, refurbished or brand-new Model A roadster components to build from scratch several cars. Everything else on the roadster he makes (with the exception of the body, which—as my piece pointed out—is made of fiberglass) is exactly like the replacement parts available when the car was in production.

As for prices being paid for mint specimens of the originals, you ought to try to buy one from a zealous owner at a big, important national show. I have had quoted to me a price of $15,000 for a slightly-less-than-perfect '31 roadster.

A rink for hockey on air

Enclosed is a picture of the air-type hockey game I built with the help of my woodshop instructor and your



article (*Build this Tabletop Hockey Game for Family Fun*, page 94, Nov. '75).

The game won a blue ribbon at the Oklahoma Industrial Arts Assn. fair. In two and a half months of "field testing," my family, friends and I have enjoyed the game immensely. I am 14.

SAM HILL
OKLAHOMA CITY, OKLA.

For photocopies of the hockey-game article, send 75 cents to Box 1014, Popular Mechanics, Radio City, N.Y. 10019. Copies of other articles in past issues may be obtained at a cost of 25 cents a page.

Cigars in the wind

I enjoyed *The Incredible Flight of Cal Rodgers* (page 78, Sept. '76). I'd like to point out one technical error, however.

The article states that Rodgers reportedly burned up 19 cigars on one particularly windy day. The assumption is that wind affects the airspeed of a plane, which it definitely does not. An airplane that has the power to cruise at 55 mph will do so regardless of crosswind, headwind or tail wind. If it is blowing 100 mph up there, your machine will churn through its section of air at whatever its mathematically assigned speed (figuring in engine power, load, configuration) happens to be.

Wind aloft affects ground speed only. So our hero's cigars were protruding into a 55-mph wind regardless of whether he was sailing along with a tail wind or bucking a head wind. It's a small point, perhaps, but we flight instructors spend hours sometimes getting it across to our students.

JAMIE BRYSEN
SONORA, MEXICO

But it's a point well taken. Our editors slipped up on this one.

Clearing up the CO_2

I'm writing in regard to a mistake in *Science Worldwide* (page 66, Nov. '76). I found the item on converting factory emissions into fertilizer interesting, but was confused as to the gas used. The article consistently spoke of carbon monoxide, yet gave the chemical formula CO_2, which is carbon dioxide. As any amateur chemist knows, there is a tremendous difference between the two gases. The correct formula for carbon monoxide is CO.

BUDDY RANDOLPH
SPRINGFIELD, TENN.

A number of readers spotted the error. Our red-faced science editor says he's amateur enough to know the difference between the two gases. It was an inadvertent mistake—the formula should have been given as CO.

More on big oil leak

Thanks so much for your article, *World's Biggest Oil Leak* (page 30, Sept. '76). I've often thought there must be a better way to dispose of old oil than "dumping it on the dandelions." My appreciation to the two Marys of Sunnyvale, Calif., and to Continental Oil for the part they are playing in recycling used oil.

CHERYL RUFF
MANHATTAN, KANS.

Материал, защищенный авторским правом

The four-wheel-drive Scout Traveler, with more cargo space and a heavier payload than Jeep Cherokee.

Eight more cubic feet and 137 more pounds of payload.

Incredible but true! The new 1977 Scout Traveler gives you more space and more payload than Jeep Cherokee—with a trim, maneuverable design that's a full five inches narrower.

Trimmer outside to maneuver through the tight spots, but more spacious inside, with 103 cubic feet of cargo area to let you take everything along.

Traveler. Chosen "The 1976 Four-Wheel-Drive Vehicle of the Year" by the editors of Four Wheeler and Off-Road magazines. It's beautifully designed to combine rugged off-road performance with highway comfort.

You can order Traveler with a full range of options. From power brakes and power steering to air conditioning and cruise control.

Test drive a four-wheel-drive Scout Traveler. And bring the family along.

Scout the America others pass by.

INTERNATIONAL HARVESTER

Материал, защищенный авторским правом

SCIENCE WORLDWIDE

A take-along oxygen supply

Portable oxygen units enable emphysema sufferers and others requiring inhalation therapy to get out of the house—to drive a car, go to work or out to dinner. But many units are heavy and awkward to move around.

A new system on the market—the Erie Traveler—employs an aluminum tank to cut total weight to 9½ pounds, reportedly making it 30 percent lighter than competitive units. Under normal use, the tank provides about a five-hour

supply of oxygen, according to the maker, the Erie Manufacturing Co., Milwaukee, and is rechargeable. The Traveler (shown being worn by model) retails for $165.

Can chimps sense earthquakes?

The altered behavior of chimps at a Stanford University primate research facility has led scientists to think that the animals may have been reacting to impending earthquakes. Prior to a series of minor quakes in California last June, researchers noted the "animals were more restless than usual and spent more time on the ground than high on the climbing structures and nesting areas."

At the time these changes were noted, the primates were under observation in connection with other research. Interest in the chimps' reactions was triggered by recent Chinese reports of animal behavior changes preceding a major earthquake. For more on earthquakes and animal behavior, see "Our Next Earthquake: How Soon? (page 63, Dec. '76).

Case of the missing grandmummy

A 3000-year-old lock of hair has proved to be a major clue in the recent identification of a "lost" Egyptian mummy, according to Dr. James E. Harris, a University of Michigan scientist who has devoted years to the study of Egypt's Royal Mummy Collection. The hair was contained in a miniature gold casket found in King Tutankhamen's tomb many years ago. An inscription indicated that the hair was from Queen Tiy, Tut's grandmother who died in 1360 B.C. and whose mummy was thought to be lost. Some scholarly hunches led Dr. Harris and several associates to closely examine the mummy of an elderly woman found in 1898. Scholars had thought the mummy that of a woman of no particular importance.

The Harris team took hair samples from the unidentified mummy and analyzed their chemical content with the aid of an "electron probe." Similar tests of Queen Tiy's lock of hair showed that both samples had come from the same person. (The chemical composition of hair varies greatly from person to person, say the scientists, making it a good means of identification.) In addition, computer analysis of X-ray skull profiles indicated that the skull of the previously unidentified mummy closely resembled that of Thuyu, Queen Tiy's mother. Case closed.

For well-spaced crops

A small rubber belt that drops seeds one by one is taking the waste out of crop planting. Engineered by the Goodyear Tire & Rubber Co., the belt (top, right) is used as a spacer-conveyor on a precision seeder. Single-seed planting cuts down on losses when crops

have to be thinned, according to a Goodyear spokesman.

Evenly spaced teeth on the underside of the belt fit into a sprocket drive and notches on the top surface cradle the seed. The planter is used for a variety of crops, including beets and tomatoes.

Reducing lowers cholesterol

Rather than going on a "fat free" diet, the first step to take in lowering cholesterol and other fats in the blood is to reduce excess weight. A team of researchers at the University of Michigan School of Medicine came to that conclusion after studying virtually the entire adult population of Tecumseh, Mich.

Consumption of 110 different food items, both high and low in fats and sugar, was tabulated for 4057 adults. Levels of blood fats were measured. Researchers found no significant association between fat levels in the blood and the frequency of consumption of fat, sugar, starch, alcohol and tea. But cholesterol and other fat concentrations were significantly higher among men and women who were markedly overweight. ★★★

Материал, защищенный авторским правом

© 1976 R. J. Reynolds Tobacco Co.

One of a kind.

Where others seek mere wealth, he searches for experience.

He captures it in his own distinct way.

He smokes for pleasure.

He gets it from the blend of Turkish and Domestic tobaccos in Camel Filters.

Do you?

Turkish and Domestic Blend

19 mg. "tar", 1.2 mg. nicotine av. per cigarette, FTC Report APR. '76

Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.

Материал, защищенный авторским правом

APPLIANCE CLINIC

BY PAUL MANN

Shelling out

We own a Hotpoint Model GHMB 700 food disposer which has a bad on-off switch I want to replace. But I'm being blocked by the plastic housing around the unit that must be removed to get at the switch. I can't see how to get it off. Please help.—Steve Schultz, Hillside, Ill.

What you call a plastic housing, Steve, is an insulated sound shell that supposedly reduces the noise level. I can't tell you definitely how to remove it because no fewer than five different attachment methods are used. But here's a try:

Some shields, like the one you see in the illustration, are two halves which are joined together by tabs and held by a metal clamp band. You have to bend open the tab on the clamp band and pry the halves of the shell apart with a screwdriver.

FOOD DISPOSER

Other shields are also in two halves, but with one half bent over and locked to the other by tabs. Still another setup has a latch that is out of sight. You have to stick your head behind the unit and near the drain pipe to find it.

Play around and see what you can do, Steve. One thing's for sure: If you happen to break the shield apart, the unit won't run any better or worse —only noisier.

Hot stuff

I recently purchased a used General Electric "Power Shower" automatic dishwasher that works well, except that I get an electric shock if I touch both the machine and stainless-steel sink when the machine is active. I do not get a shock when the machine is off, although it is plugged in. My house is old (circa 1900) and doesn't have safety grounded wiring. The common line is grounded to the plumbing. Could this be causing my problem?—Joe Richardson, Ashton, Ill.

I doubt it. Rather, I think the used machine you purchased has an internal defect, such as a pinched wire or grounded motor, that's causing current to leak through the case. My advice, Joe, is that you do not use this machine until a competent service technician finds and corrects the condition.

Anticlinger clinker?

I've been hearing that antistatic agents sold in supermarkets for use in automatic clothes dryers to keep clothes from clinging could damage a dryer's motor. Is it true?—Dave DeYoung, Ogden, Utah

No, but . . . Guess I'd best elaborate. These products won't damage the motor, but may harm the drum. When they were first marketed, some attacked the porcelain, causing the finish to pit and get rough. I think it's still wise to keep an eye on the drum for trouble signs.

ImPORTant

The oven burner of our Magic Chef gas range is acting up. Sometimes only half of the burner lights. The half facing the pilot light always ignites, but the other half and the front section don't always catch, making it necesary for us to use a long candle or match to get full ignition. Is the burner defective?—Raymond Poche, Baton Rouge, La.

I wouldn't think so. Rather, there are two common reasons for partial ignition. The more likely one is grease that has run over the burner from cooking and is clogging some ports, making it difficult for the flame to jump. Turn off the knobs controlling gas flow to the burner and remove the burner from the oven. Get your kit of drills from the workshop and determine which drill size fits the gas ports. Select the next smallest size drill and carefully ream out each port by hand.

Return the burner to the oven and try it out. If the condition prevails, then what probably has happened is that there was a manufacturing error and one or more gas ports were not drilled into the burner. Remove the burner from the oven and measure the spacing between ports. Let's say that ports are measuring $^{3}/_{16}$ in. apart and you run across a spacing which is $^{5}/_{16}$ in. Flame has a tough time jumping the extended space, which accounts for delayed ignition. Extended spaces are most likely to be found at bends in the burner.

If you find incorrect spacing, indicating missing ports, have a service-man replace the burner or drill out the necessary additional holes.

Off and running

My General Electric refrigerator (Model TB 14S), which I bought in November 1975, seems to run excessively. The GE serviceman advises that the refrigerator is programmed to run 61 percent of the time. Is he right? If so, is there anything I can do to reduce the running time?—Jim Blair, Toledo, Ohio

Yes and no, Jim. Yes—he's right. No—as long as there's no mechanical problem such as a low-grade freon leak, there's nothing you should do to reduce running time. My answers are based on the premise that food is being kept properly.

Although newer-model refrigerators run more frequently than their predecessors, they are actually more efficient from an energy-consumption standpoint. The use of smaller rotary-type compressor motors is given the credit. You should consider yourself lucky. Whereas your 14-cu.-ft. nonfrost-free model runs 61 percent of the time, the new 18-cu.-ft. and larger frost-free refrigerators are programmed to run almost 90 percent of the time.

Hot line for fixers

Here are two toll-free telephone numbers to keep handy if you own appliances made by Whirlpool or Westinghouse. You can call them to get advice about problems and how you may resolve them, or if you just want to air a complaint.

The toll-free number for Westinghouse is 800-245-0600. For Whirlpool it's 800-253-1301. ★★★

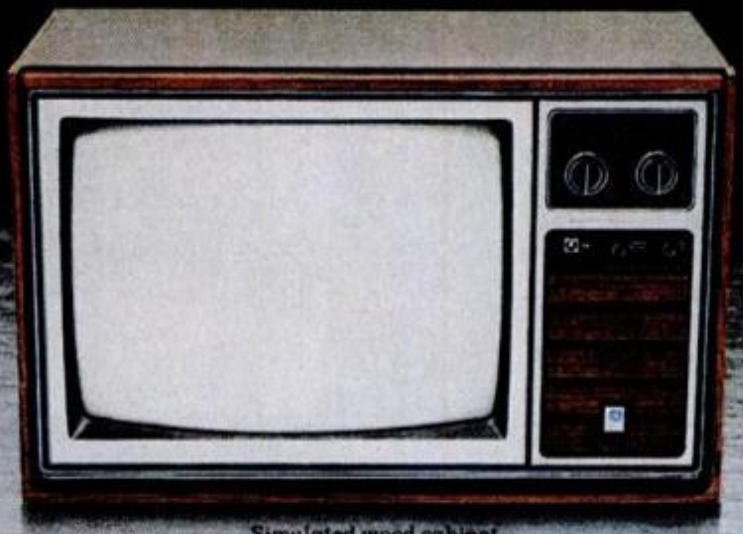
If you have a question about any appliance, send it to Appliance Clinic, Popular Mechanics, 224 West 57th St., New York, N. Y. 10019. Sorry, but letters cannot be answered individually. Problems of wide interest will be discussed in this column.

Материал, защищенный авторским правом

There's a signal in the air that lets the broadcaster control the color.

There's a set that can use it now.

Ours.



Simulated wood cabinet.
V.I.R. is available on model shown and several console models.

Our set is General Electric. The signal is called V.I.R. And both are remarkable. Many TV programs are now transmitted with this special V.I.R. signal. Advanced computer-like circuitry, in selected GE color models, uses this V.I.R. signal to give you color and tint adjusted by the broadcasters themselves. 60 times every second. Continuously. Automatically. This means you won't have to fiddle with color control settings, because General Electric's V.I.R. system makes these adjustments for you. All you have to do is sit back and enjoy broadcast controlled color.

We invite you to see a demonstration at your GE dealer. Look for the V.I.R. light on a General Electric set. It tells you the V.I.R. signal is being sent and being received by the GE set. Then watch the GE set automatically adjust the color in the picture. You've got to see it to believe it.

V.I.R. Broadcast Controlled Color. GE has it. Now.

vir

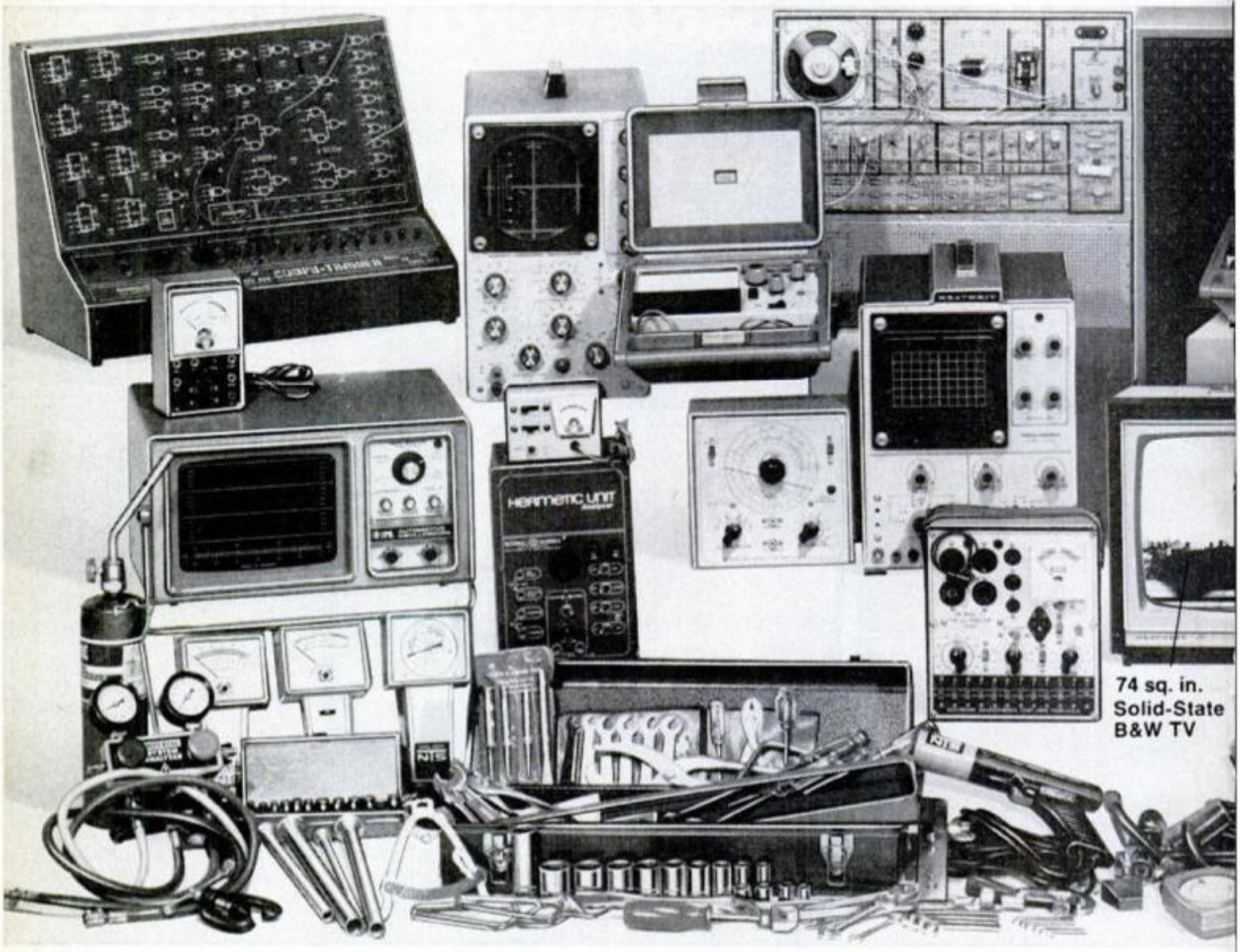
VIR
BROADCAST CONTROLLED COLOR

THIS IS GE PERFORMANCE TELEVISION

GENERAL ELECTRIC

The better the training the better you'll

Send for one of these FREE Illustrated



Build and keep some of the finest technical equipment made when you train with an NTS Project-Method home study course. And it's usually the same type of equipment you'll meet in the field and use on the job. It will help you acquire first-hand experience and skill — help prepare you better for a variety of exciting technical careers:

ELECTRONICS DIVISION: Courses include professional equipment like 5" solid-state oscilloscope, transistor and tube-tester, vector monitor scope, 74 sq. in. B&W TV, and solid-state stereo AM-FM multiplex receiver, speakers. Color TV courses feature advanced NTS/HEATH DIGITAL GR-2000 Color TV with silent varactor diode tuning; digital read-out channel selection (with optional digital clock), big 315 sq. in. screen.

MECHANICS DIVISION: Learn engine diagnostics, motor overhaul, transmissions, automotive maintenance. Courses include 9 in. solid-state automotive oscilloscope, testers, tools, mechanic's steel tool box, & more.

AIR CONDITIONING, REFRIGERATION/HEATING DIVISION: Learn servicing of commercial, industrial and residential heating and cooling equipment. Courses include hermetic unit analyzer, leak detector, charging testing-purging manifold set, tools and more.

HOME APPLIANCES DIVISION: Courses cover repair and maintenance of washers, dryers, ranges, smaller appliances. Equipment includes NTS Circuit-Trainer and professional multimeter.

Материал, защищенный авторским правом

and the equipment be equipped.

Career Guides:

COMPARE OUR KITS AND LESSONS. COMPARE OUR TUITION.

(Simulated TV Reception)

LOWER TUITION FOR YOU: We employ no salesmen, pay no commissions. You receive all home-study information by mail only. Make your own decision, your own comparisons. Send card today or write for illustrated catalog in field of your choice, all details.

NO OBLIGATION. NO SALESMAN WILL CALL.

APPROVED FOR VETERAN TRAINING
Get facts on new 2-year extension.

NATIONAL TECHNICAL SCHOOLS
TECHNICAL-TRADE TRAINING SINCE 1905
Resident and Home-Study Schools
4000 So. Figueroa St., Los Angeles, Calif. 90037

NATIONAL TECHNICAL SCHOOLS **Dept. 201-027**
4000 South Figueroa St., Los Angeles, Calif. 90037
Please send FREE Color Catalog and Sample Lesson.
NO OBLIGATION. NO SALESMAN WILL CALL.

- ☐ **Electronics Division**
- ☐ **Mechanics Division**
- ☐ **Air Conditioning/Refrigeration/Heating Division**
- ☐ **Home Appliances Division**

NAME _____ AGE _____

ADDRESS _____

CITY _____ STATE _____

Please fill in Zip Code for fast service _____

- ☐ Check if interested in G.I. Bill information.
- ☐ Check if interested ONLY in classroom training in Los Angeles.

ONLY DATSUN

has the small pickup with room inside for long legs and large loads.

Like most small pickups, Datsun's exclusive King Cab™ has a 6-ft. bed for hauling stuff outside.

Unlike any other small pickup, it has room for hauling stuff inside. Up to 11.3 cu. ft. of storage space behind the seats.

And unlike any other small pickup truck around, it comes with reclining bucket seats. Plus such surprising features as more leg space than some full-size rigs. Full carpeting. And an extra-long wheelbase for smoother rides.

Not surprising, it's stingy on gas. 32 MPG on the open road, 22 around town with manual transmission. Of course, those are EPA figures. So your mileage may differ depending on the condition of your truck and how you drive. California mileage slightly lower.

Suddenly it's going to dawn on you.

DATSUN SAVES

One more strong point: King Cab utilizes the same all-steel body construction and rugged ladder-lattice frame as the Li'l Hustler that won the teeth-rattling Baja 500. So you know it can take a load of punishment.

If by chance it ever does need service, you can count on some strong backing from over 4,000 Datsun service technicians.

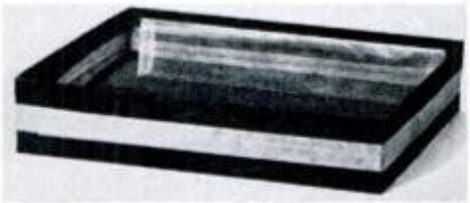
Add it all up and it's pretty easy to see why Datsun is America's Number One Selling Small Pickup.

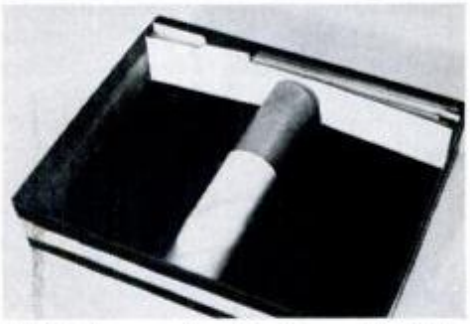
Материал, защищенный авторским правом

PHOTO HINTS

FROM READERS

Easy cost-free negative files





With film coming in 20 or 36 shots per roll, we 35-mm photographers wind up with a lot of negatives to file.

I file mine in storage files made from empty 100-sheet 8x10 enlarging-paper boxes. It takes two such boxes to make a file: I cut the bottom out of one and stack it over the other, then carefully tape the two together (top), both inside and out. That makes a box just the right size to hold six-negative strips of 35-mm film in glassine envelopes.

To keep the envelopes from shifting in the box, I prop them up with a telescoping tube made from two toilet-paper roll cores, one crimped down to jam into the other. As the box fills, cut the tube shorter. When it's full, take the tube out. It works and it's all free.—*Grace B. Weinstein.*

Painted cap saves missed shots

The usual black or chrome lens caps blend in with a black-and-chrome camera so it's easy not to notice it's on. Paint your lens cap a bright color so you won't forget to remove it. It'll be easier to find if you drop it, too.

—*Doug Neitzel.*

This staple gun even drives into hardwood oak!

Install insulation.

Recover furniture.

Put up ceiling tile.

The Swingline Powergun 1000™ is an extra heavy-duty staple gun powerful enough to do any stapling job, from insulation to ceiling tile, upholstery to fencing, shades to screens.

Uses 5 staple sizes. For do-it-yourselfer or professional! The Powergun 1000 staple gun does it all. Try it!

THE Swingline® COMPANY

A Division of Swingline Inc., 32-00 Skillman Avenue, Long Island City, N.Y. 11101

FREE BLUEPRINTS *and* PLAN READING LESSON

CHICAGO TECHNICAL COLLEGE
2000 So. Michigan Ave., Chicago, Ill. 60616

Beginners, craftsmen, even foremen and superintendents, have sent for these free blueprints and trial lesson in Plan Reading as a means of trying out Chicago Tech's home-study Builders training. Learn how you can master Plan Reading—Estimating—and the practical details of all types of construction in your spare time at home. Mail coupon below today—see how you, too can prepare for a better job—higher income, or start your own contracting business.

CHICAGO TECHNICAL COLLEGE
Dept.PM-27, 2000 S. Michigan Ave., Chicago, Ill. 60616

Veterans Check Here ☐

Please mail me a Free Trial Lesson, Blueprints and Builders Catalog. I understand there is no obligation—no salesman will call.

NAME_____ AGE_____
ADDRESS_____
CITY_____ STATE_____ ZIP_____

How to body English your bike and be a better rider

By Bill Hampton

If you're a serious motorcyclist, you take pride in the way you handle a motorcycle. A good place to practice handling is a paved, empty parking lot. It's ideal for "feeling out" your bike's personality, because it's similar to the surfaces you ride on normally, if you are a street rider. And if you're getting into dirt riding, first practice on a smooth dirt field. Then gradually accustom yourself to rougher terrain, as your skill and confidence increase.

Even if you're a veteran rider, you can still improve your skills by undertaking the techniques in this article. Especially if you've just got hold of a new set of wheels.

Before we start specific exercises, let's get loose with that machine. Don't sit on it as though you're coming down with rigor mortis. Be relaxed, but alert. Try to be fluid in all movements. Remember: That critter is an extension of *you*.

Body English in action: A trials rider balances his motorcycle and changes direction while almost standing still.

QUICK-TURN TECHNIQUE

Potholes can be killers. Sometimes you don't see them until you're on them. Throw your bike off its course and around the obstacle with this technique.

Start with figure-8s

You could start by cutting some wide figure-8s. Get to know how far you can lay the bike over before it grounds or the tires lose adhesion. Be careful, though: There's a fine line between traction and spilling at sharp bank angles.

By cutting figure-8s, you get to know how that two-wheeler feels banked to both sides.

Gradually tighten up each succeeding figure-8 you make. Naturally, the tighter the turns, the slower you'll be traveling. Keep both feet on the footrests. Dragging the turn-side foot not only looks sloppy, but it tends to interfere with the bike's balance and control.

Keep cutting smaller and smaller 8s until the handlebar is almost at full lock. When you get to that point, you'll have to make use of body English to keep the bike from falling into the center of the turn. So now you must lean to the opposite side in which the bike is turning to maintain balance.

During low-speed turns, you'll get even better control by standing up —or crouching—on the footrests. The motorcycle will respond more quickly to your movements when you're poised on the footrests, for the reason that your body's center of gravity is placed farther away from the cycle's center of gravity, so that you have more leverage to exert against the machine.

The quick turn

Body English also comes into play in the "quick turn" maneuver, in which the motorcycle is tilted quickly to the side. The idea is to throw the machine off course momentarily to avoid something in its path.

By simultaneously pulling up on one handlebar grip and pushing down on the other one, you can make the motorcycle veer to the down-grip side to avoid something.

This technique is important to master, because it can keep you from running into some object that suddenly pops up in front of you out of the road. Immediately after

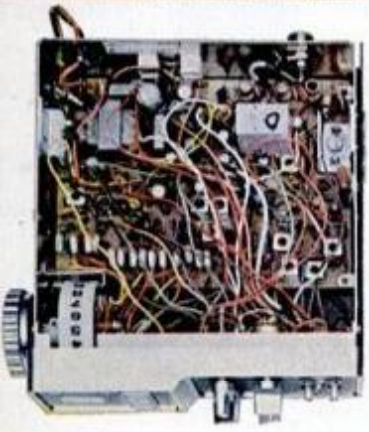
(Please turn to page 27)

Minimize unavoidable impacts by lightening the front end: Move your body back, pull up on handlebars and apply throttle.

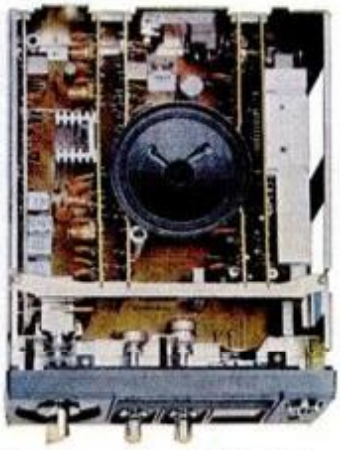
Материал, защищенный авторским правом

Royce CB is built to take it.

We put a Royce CB in a paint shaker and it took it.



The typical CB. A mass of wires. Old-fashioned methods of soldering and assembly, tuning and testing.



The advanced Royce CB. Exclusive modular construction. Fewer wires. And the quality of automated assembly and computer tuning.

Here's Why. Precision, simplicity, and exclusive modular design. That's the Royce difference. And that's why the Royce CB is tough enough to take the circuit-jarring torture of a paint shaker.

When you've got a 40-channel Royce CB, you've got quality in a lot of different ways. Like exclusive modular circuit design. The simplicity of fewer wires. The strength of automatic soldering. The precision of automated assembly. And the quality consistency of computer tuning.

Put it together and you've got one tough CB radio. The 40-channel Royce CB radio. It's built to take it. And that's why **Everybody's talking 'bout Royce**

© Royce Electronics Corp. 1976

Write for free brochure or send $2.00 for full-color 1977 40-channel CB catalog to Royce Electronics Corp., 1746 Levee Rd., N. Kansas City, Mo. 64116.

CHANGE YOUR OIL WITH HAVOLINE AND PROTECT YOUR CAR LIKE A TROOPER.

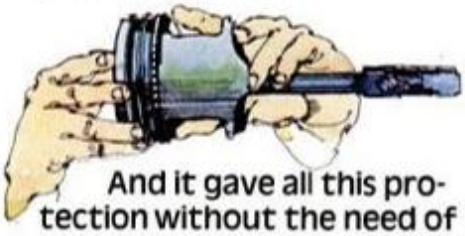
A state trooper gives his car a rough time.

Which is why we had more than 90 trooper cars with Havoline Super Premium All Temperature Motor Oil driven a total of over 4 million tough miles—4 million miles of all kinds of driving in all kinds of weather—from standing starts to high speeds in a matter of seconds.

And often, the same car was driven round the clock—24 hours a day.

These state trooper cars were driven almost as many miles in 6 months as the average car is driven in 3 years.

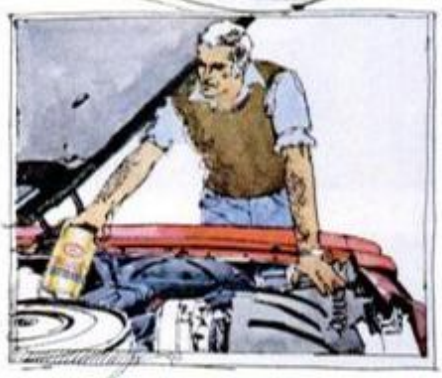
Yet there wasn't a single oil-related failure of Havoline-protected parts.



And it gave all this protection without the need of any extra motor oil additives.

So the next time you change your oil, protect your car like a trooper with competitively priced Havoline Super Premium. It provides all the protection your car needs.

Ask for Havoline wherever they sell motor oil.



Материал, защищенный авторским правом

(Continued from page 24)

initiating the push/pull action on the grips, bring the bike back into line by push/pulling on the grips in the other direction.

Try a slalom

Another good technique for learning how to use body English to control your bike is the slalom ride. Lay out a straight line of pylons, paper cups or plates, or some other similar objects, placed several feet apart. At first, place the pylons far enough apart so that you can weave in and out of them rather easily. As you become used to the bike's behavior, gradually close up the distances between the pylons until you have to travel quite slowly, swinging your body from side to side to maintain control.

To make this exercise more difficult, place boundary lines on both sides of the row of markers, or pylons, so that you have to stay within a certain maneuvering space.

Take it slow

For improving your balance and low-speed control, try slow racing. The object behind this exercise is to see how slowly you can ride without losing your balance and stalling the engine or putting a foot down.

To make slow racing more interesting, stay within boundary lines, set a few feet apart, for at least 30 feet. You'll find yourself using body English to stay within bounds. It takes good balance, working both the clutch and gas to control that machine at a creeping pace.

Competing with other riders makes slow racing fun. Naturally, the last one to the finish line who doesn't stall or lose his balance is the winner. For individual riders, this event can be timed.

For further improving your balance and control, try riding on a straight line or a plank. This exercise is a real test of balance and control, too. Or you could lay out an S-shaped section, 6 to 12 inches wide, and 30 to 40 feet long. Try staying within the boundary lines as you negotiate the curved path.

Safe braking

Learn how to stop your bike safely in the shortest possible distance. Bringing a motorcycle to a safe halt can be somewhat tricky, considering its peculiar stability and traction problems, along with its independent braking system.

For maximum stopping power, you must use both brakes together. Keep in mind, too, that the front brake has *three* times more braking capacity than the rear brake. Besides the front and rear brakes, there is a "third brake"—engine compression.

By downshifting through the gears as the brakes are applied, you can reduce stopping distance even more than if you just used the brakes.

However, the retarding effect of a four-stroke engine is greater than a two-stroke engine. Keep that in mind when you switch bikes with different engine designs. The two-stroke jockey has to work the brakes a little harder to compensate for lack of effective engine compression.

Many cyclists, particularly beginners, shy away from working the front brake very hard. They fear locking up the front wheel and spilling. But as long as the ground surface is firm and dry, the front brake can be applied quite hard without its locking up the wheel. You do have to develop a sensitivity to the brakes and learn just how much pressure can be applied to them to stop the bike without skidding.

Braking can be practiced progressively. Start out somewhere around 20 to 25 mph and practice stopping in the shortest possible distance.

When you reach that point, increase the speed by 10 to 15 mph and again practice decelerating until you've learned to stop in the shortest distance.

Depending on the space you have available to practice in, gradually work up to higher speeds that you would normally ride at on the highway. In fact, you'll probably have to go out on the road to continue your higher-speeds braking technique. But make sure there's no traffic. Find a little-used road.

Stopping on a spot

Back on the parking lot, you might want to try another little braking exercise: spot stopping. With this exercise, you stop your machine so that its front tire rests on a predesignated point or "spot." There are different ways to do this. If you have the room, one is to select a spot 50 or more yards away after you've built up some speed, and "aim" for it. See how close you can come to stopping with your front tire resting on it.

Another way is to make a succession of stops on a series of predesignated points. For instance, you could lay out the points by marking a number of Xs on the ground or by using the lines that separate parking-lot stalls. Have the stopping points far enough apart so that you can build up speed between them.

To make this exercise even more

(Please turn to page 28)

Weaving bike in and out of slalom setup with closely spaced paper plates (above) is good exercise in balance and control. Spinning doughnuts (as shown top right) is fun, of course, but it also teaches control of your machine under awkward or emergency situations. The power slide shown at right is being deliberately executed by a competition rider. Note how he maintains control of the bike by turning the front wheel in the same direction that the rear is sliding.

Материал, защищенный авторским правом

(Continued from page 27)

challenging, keep your feet on the footrests as you come to a stop; then, without putting a foot down, see how long you can maintain balance, before you start off for the next point.

Practice in the dirt

You should also learn how your motorcycle handles on loose surfaces. Even if you're strictly a road rider, you never know when you'll hit a section of rough dirt road or a paved road covered with stones, sand and dirt.

And if you've never learned how to handle your two-wheeler on such surfaces, you stand a good chance of overcontrolling and spilling when you do come upon them suddenly.

When you first ride on rough or loose terrain, you might be a bit apprehensive at the motorcycle wanting to "wander" around a little. Let it go. It's just picking the best path for itself. If you fight the bike's movements, you'll only interfere with its self-stabilizing tracking.

Stay loose

If you poise your weight on the footrests, you won't mind that bike shifting around underneath. You'll have better control and your legs will act as shock absorbers, putting less strain on the rest of your body.

And if you suddenly come upon some obstacle that your bike can get over, switch your weight to the rear (while still up on the footrests) and jerk up on the handlebars at the same time you grab a handful of throttle.

If you can coordinate these actions, you'll lighten the front end so it either clears the obstacle completely or climbs easily over it.

Of course, it depends on the size of the bike, too. Don't try to play leapfrog over a tree stump with a 1200-cc Harley-Davidson. You have to use a little common sense as to what you can actually do with your motorcycle.

Another technique that you can learn in the dirt and adapt to the street is the "cross-up."

Advanced exercises

Here's how it works: Get your bike moving at about 15 to 20 mph and jam on the rear brake. Don't touch the front brake. Now if you lean slightly to the side *opposite* the rear-brake pedal, the locked-up rear wheel will slide out to the outside. In other words, the rear end of the bike is kicked out to the opposite side you're leaning.

With your lean-side foot down on the ground for support and the rear brake kept on, you turn the front wheel toward the same side the rear wheel is going.

With this technique, you can control a rear-end slide or turn the bike abruptly. When you master the cross-up at one speed stage, try it at a slightly higher speed.

That's another secret of becoming the motorcycle's master: learning a technique in stages.

Once you have the bike leaned over, don't let it back up. If you

(Please turn to page 32)

Climbing over an obstacle like this is easy for an expert trials rider who's mastered the art of body English. Wear a helmet until you can do it without falling!

Learn from NRI at home and at York Institute.

Start a career in Air-Conditioning, Heating & Refrigeration.

Well over a hundred thousand new technicians will be needed in the field of air-conditioning, refrigeration and heating by 1985. NRI can train you at home in your spare time for one of these career jobs.

Master course includes your own Air-Conditioner System for training

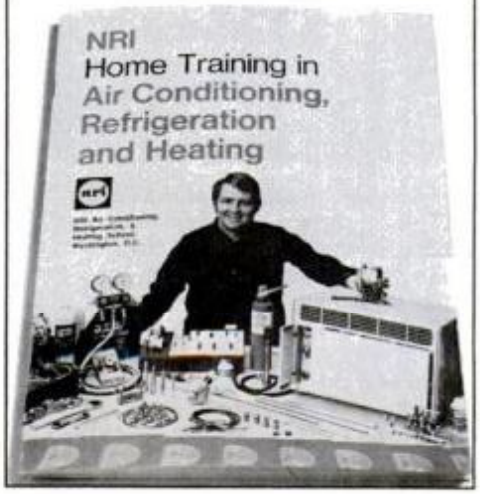
NRI's Master Course in Air-Conditioning, Refrigeration and Heating comes with a window air-conditioner for hands-on experiments. You get bite-size lessons, fine professional instruments and expert instruction every step of the way. A Circuit Demonstrator, Control Simulator, tubing and joint-making demonstrator, leak detector, and system analyzer are included.

Optional resident training at famous YORK Institute

Graduates of the Master Course may take advanced work at the world-famous York Institute Resident School at no extra charge. You'll get practical experience equal to months of on-the-job work.

Rush for free NRI catalog.

Just check the card opposite. No salesman will call.



Материал, защищенный авторским правом

You can turn the CB boom into income... with NRI's Complete Communications Course

NRI can train you at home for a part-time job or a full-time career in communications.
The field of communications is bursting out all over. More than 25 million CB sets are in operation with millions more being sold annually. That means countless careers in design, installation, and maintenance. Start training at home now, the NRI way.

Get your all-important FCC License.
FCC rules require that CB transmitters be serviced only by the holder of a First or Second Class FCC Radiotelephone License, or under the supervision of a license holder when the transmitter is connected to a "radiating antenna." NRI will give you the necessary training to get that all-important First or Second Class FCC Radiotelephone License so that you can qualify for one of the many available openings.

Learn on your own 400-channel digitally-synthesized VHF Transceiver.
The 48-lesson NRI Complete Communications Course teaches you to service and adjust all types of two-way radio equipment (including CB), using the one unit that is best equipped to train you for CB, Commercial, and Amateur Communications...a "designed-for-learning," 400-channel, two-meter VHF Transceiver and AC power supply. Then we help you get your FCC Amateur License, with special instructions so you can go on the air. The unit can be mounted in your car, or you can use it as a base station.

The complete program includes 48 lessons, 9 special reference texts, and 10 training kits. Also included are: your own electronics Discovery Lab™, a new Antenna Applications Lab, an Optical Transmission System, CMOS Digital Frequency Counter, and TVOM. The course covers AM and FM Transmission Systems; Radar Principles; Marine, Aircraft, and Digital Electronics; and Mobile Communications. You must earn your First Class Radiotelephone FCC License or you get your money back.

TM McGraw Hill CEC

CB Specialist's Course also available.
NRI now offers a special 37-lesson course in CB Servicing. You get your own 40-Channel CB Transceiver, AC power supply and multimeter, for hands-on training. Also included are 8 reference texts and 14 coaching units to make it easy to get your Commercial Radio-telephone FCC License—enabling you to test, install and service communications equipment.

Over a million have enrolled with NRI.
Send for the free NRI catalog and discover why more than a million people like yourself have chosen the NRI way as the right way to get ahead. You learn at home with bite-size lessons, progressing at your own speed to your FCC License and then into the communications field of your choice. There's no obligation and no salesman will call.

If insert card has been removed, write:

NRI SCHOOLS
McGraw Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

Материал, защищенный авторским правом

Put a torch to your home repair bills.

A BernzOmatic propane torch, that is. It can help you save time and money on all types of household jobs. Inside, outside, all around the house.

Inside the house, your BernzOmatic propane torch will solder copper pipes, copper valves and elbow connections. It can thaw frozen pipes, seal an unwanted drain and loosen stubborn pipe joints. Or use it to connect electrical wires.

Outside, your BernzOmatic propane torch can back out rusted-on nuts and bolts from your car wheel, for example. Use it for removing exterior paint or window putty or repairing leaky gutters.

All around the house, your BernzOmatic propane torch will help simplify dozens of household jobs—from laying floor tile to raising grain in wood to furniture repairing. And it's ideal for dozens of hobby and craft applications.

Visit your BernzOmatic dealer and find out why the BernzOmatic propane torch is the do-it-yourself favorite of handy men and women.

BERNZ O MATIC®

Car Starting Problems?

. . . Won't Start Because of WEAK BATTERY?
. . . Won't Start Because of COLD WEATHER?
. . . Won't Start Because of WET WEATHER?

Coil/Foil®

AUTOMATIC STARTING BOOSTER
. . . is the ANSWER to these Problems!

✱ GIVES YOU "Sure-Fire" STARTS EVERY TIME...

If your Cold or Weak Battery can turn the Engine over just ONCE . . . COIL/FOIL will START your Car, even under the worst weather conditions, by Automatically providing a STRONG Spark from its OWN Power Source.

- EASY-TO-INSTALL (only 4-Wires & 2-Bolts). Fits ALL Vehicles with Battery/Coil Systems.
- COIL/FOIL Prolongs Car Battery Life . . . and reduces wear and tear on Starter-Motor and Ring-Gear.

✱ No one in your Family need ever be STRANDED with a Car that WON'T START! No more running the Car Battery "DEAD" trying to start the Car! COIL/FOIL uses its own Power (2-Dry Cell Batteries, not included) ONLY in Starting, and Batteries usually last a Year.

- *TESTED and APPROVED by Leading Automotive Magazines and Authorities!*
- *Comes with... FACTORY WARRANTY.* Copy available on written request. ADVANCED ELECTRONICS, N.V., 1625 EYE St., N.W., Washington, D.C. 20006
- ORDER NOW! . . . and never be caught with difficult Starting AGAIN! Install the COIL/FOIL and prove to yourself that it works or your money back.

SPECIAL Introductory Offer Only $19.95

ADVANCED ELECTRONICS, N.V.
P.O. Box 1579 — PM, 2, Washington, D.C. 20013

Please RUSH _____ COIL/FOIL Units to:

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

• MAKE/YEAR of Vehicle _____

Add $2 for Postage, Insurance & Handling. Canadian & Foreign Add $3.

Enclosed: ☐ Check, ☐ M.O., in amount $_____

30-DAY "NO RISK" TRIAL . . . SATISFACTION GUARANTEED or Return Unit in 30 days for Full Refund.

YOUR MOTORCYCLE

(Continued from page 28)

do, it'll "slingshot" you right over the handlebars.

After you really have the hang of executing the cross-up with the aid of the rear brake, try it by using the throttle instead of the brake. So get the bike's speed back down to 15 to 20 mph again.

Now lean the bike slightly to one side and turn on the gas. As the back wheel slides away, you turn the front wheel toward the same side the rear wheel is going.

By using the throttle to control the cross-up, you can turn the bike abruptly by power sliding it.

Mastering the cross-up and power slide techniques first in the dirt can help you control a skid or avoid some other danger later out on the road.

A variation of the cross-up and power slide is the "donut." To cut a donut (with the bike stationary) put a foot down for support and lean the bike. Turn the front wheel in toward the direction of lean. As you release the clutch, grab a handful of throttle and . . . HOLD ON!

The motorcycle will proceed to "chase its tail" as it spins around. The donut technique is just another exercise that teaches you how to control a motorcycle under awkward conditions.

Does it have any practical value for the street rider? Suppose you're sitting behind a car at a red light, waiting for the green. Glancing in your mirror, you notice a car bearing down on you.

What can you do? Having mastered the donut technique, you lay your bike over to the curb side and gas it. As your machine and you spin around and jump up over the curb, the car squeals to a stop—right where you were sitting a split second ago.

Knowing how to control your bike can save your life. ★★★

Rear chain must be tensioned properly for your bike to respond smoothly and surely to throttle and clutch controls. Free play should be ½ to ¾ inch at a point midway between the sprockets.

Материал, защищенный авторским правом

YOUR QUICK WAY TO EASY MONEY!

VIP VINYL INDUSTRIAL PRODUCTS

VINYL REPAIR

MAKE $20 TO $30 FOR AN HOUR'S JOB LIKE THIS

GIVE "on-the-spot" SAME DAY SERVICE GET "on-the-spot" SAME DAY PAY!!!

You can be in business IN 24 HOURS!

Sensational! That's the MONEYMAKING POWER of VIP Professional Vinyl Repair . . . the business of your own that can be part or full time for QUICK AND GROWING PROFITS! You need no study — no training — just a few hours' practice and you're ready to do repairs for pay, — BIG PAY! You can be in business practically overnight.

Start for less than you make in 1 hour on first job!

With just a small down payment, you get the complete VIP going-into-business kit . . . all equipment, materials, complete step-by-step instructions, business-building helps . . . everything you need!

"Wherever I see vinyl, I can do business"

"I've made as much as $60 in 3 hours."
C. Herrera, Jr., Ariz.

9 HOLIDAY INNS FOR HUSBAND/WIFE TEAM

"These Inns have put us on a monthly allotment. We are busy every day. Wonderful to be one's own boss. We are putting on one repairman to handle business other than Holiday Inns. With our setup, we have weekly checks coming from just the Inns."
Mr. & Mrs. Bechtel, Ohio

$513.00 in first 10 days!

"The first 10 days I made $513. Now getting business from 15 car dealers, 6 furniture stores, 4 restaurants and bars, and clothing stores."
H. Whaley, Wash.

STEADY WORK FOR 20 CAR DEALERS

"20 car dealers give me all their repair work. I call on two or three every day, take care of what's needed. No matter what the repair is, it's easy to do with VIP."
R. Lanning, Ky.

$440 IN 9 HOURS!

"I repaired 55 chairs at the NCO Club at $8 each — $440 for 9 hours' work. Materials and transportation cost only $35!"
D. Gagnon, S.C.

HERE'S THE VIP VINYL REPAIR KIT that puts you in your own HIGH-PROFIT BUSINESS

They all started by mailing a coupon like this. YOU CAN TOO!

UNLIMITED CUSTOMERS FOR YOUR SERVICE

Auto dealers, car shops, restaurants, motels, bars, clubs, hospitals, bus companies . . . these are just a few of the places that need vinyl repairs, repeatedly. The business is there, waiting for you. And a repair job that takes ½ an hour to an hour can mean a quick $15 to $30 for you . . . most of it PURE PROFIT!

MEN, WOMEN, HUSBAND/WIFE TEAMS FIND VIP QUICK, CLEAN, EASY, PROFITABLE!

Both women and men enjoy this easy, profitable way to make good money fast and steady. The VIP exclusive process is so easy, the directions so simple, that anyone who can read plain English can do it. And what a money-maker! A sure way to have an independent income, or build to a business as big as you want to make it. There's no end to the demand!

GET ALL INFORMATION FREE BY MAIL. NO SALESMAN WILL EVER CALL.

Just mail the coupon. We'll rush all facts to you FREE BY MAIL. No obligation. No salesman will call. It's hot! Do it now!

VIP VINYL INDUSTRIAL PRODUCTS
2021 Montrose Ave., Dept. 182
Chicago, Ill. 60618

ALL FACTS FREE BY MAIL – NO SALESMAN WILL CALL. MAIL COUPON NOW

Vinyl Industrial Products, Dept. 182
2021 Montrose, Chicago, Ill. 60618

PLEASE RUSH BY MAIL FREE FACTS about VIP Vinyl Repair and how I can start making money within 24 hours! No salesman is to call. I am under no obligation.

Print Name _____

Print Address _____

Print City/State/Zip _____

Материал, защищенный авторским правом

HOMEOWNERS' CLINIC

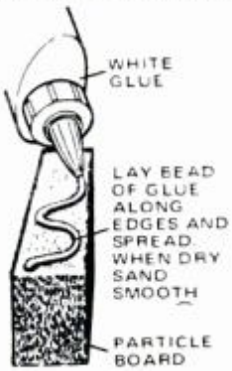
Paint peels on concrete

I've been unsuccessful in keeping paint from peeling off my concrete steps. The steps are exposed to the weather and fresh paint peels away in a few months at most. What can I do?—Victor W. Herriman, Tawas City, Mich.

Concrete steps of the permanent type are usually poured over a fill. Moisture rises from this fill and penetrates the concrete, causing the paint to peel from the surface. You don't say what paint you've used, but if you can remove it entirely, either by brushing or with a remover, I would suggest applying a masonry paint. It is compounded to resist peeling due to moisture.

Smoothing rough board edges

I bought a panel of chipboard to make a cabinet door. I got several fine slivers in my fingers and a small cut in one palm when I was handling the board. How can I finish the edges to prevent slivers?—O.J. Shepard, Carbondale, Ill.



This problem is easily solved by coating the edges with a glue you apply in a curving bead as shown. Smooth the bead to both edges with your finger. When the glue has dried, sand it smooth and round the corners of the board slightly.

Cleaning and polishing marble

There is a slab of marble in our bathroom which is many years old. It appears quite dingy, and I'm wondering if there isn't some way of cleaning and brightening it so that it's more presentable. What do you suggest?—Francis A. Herrling, Center Moriches, N.Y.

If, as you say, the slab surface is only "dingy," meaning that it's dull in appearance, you might be able to clean it by rubbing with a very fine No. 320-grit abrasive. If possible, you should remove the slab and place it on a bench or table. Attach the abrasive to a block of wood faced with felt, and work first in circular stokes, then in long strokes, keeping the surface wet with a mild, soapy solution. Dry the surface occasionally and note the progress.

This procedure will produce a matte finish. For a high polish use a fine powdered abrasive, 600 grit, wetted to form a creamy paste and applied with a saturated cloth. Commercial marble cleaners are also available.

Mildew in closets and drawers

My home is about 50 years old and is built on concrete piers. Mildew often forms on clothes in closets and drawers in several of the rooms. How do I solve this problem?—Fred N. Boggus, Harlingen, Tex.

Lack of adequate ventilation and excessive moisture is the basic cause of your trouble. I'd suggest you look into purchasing a dehumidifier. You might also consider installing louvered doors on your closets to permit air circulation. To eliminate mildew in drawers, try rearranging the furnishings—moving chests of drawers from a corner to another location. You might leave the drawers of fixed installations slightly open for an hour or so each day. Also, reduce the output of your furnace humidifier.

Cracked concrete patio

My concrete patio is 10 x 20 ft. and 4 in. thick. It has cracked all the way across the width. The crack is now about ¼ in. wide. What would cause it to crack like this, and how can I repair it?—Jaime D. Tamayo, San Diego, Calif.

Judging from your description of the crack and its location, I think the probable cause is inadequately tamped fill under the concrete. Also, it is possible that the soil under the concrete is unstable. You can repair the crack, at least temporarily, by mixing cement and sand to a creamy consistency. Before you fill the crack be sure that all dirt and any other residues have been removed. Then wet the concrete just before pouring the filler mix. Pour the mix into the crack, allowing for a very slight overfill. Then sweep away the excess, cover the work with straw, grass clippings or a coarse fabric and keep this dampened for a few days. This should give the pouring a chance to cure.

Water siphons from toilet

Water in the toilet bowl in my basement frequently siphons out, allowing gas to enter. My home is on a dead-end street and the sanitary line ends at that point. Can you suggest a cure for this problem?—Wayne Brounlee, Larned, Kans.

I'm guessing, based on the information you give, that the most likely cause for the water siphoning out is sluggish drainage of the sanitary line at its end, perhaps as a result of partial clogging. It could also be a backing from the sanitary line into your drain. I'd suggest you consult the sanitary department of your city. It should help you with the solution.

Laying brick on wood flooring

We would like to lay brick flooring in our family room which presently is covered with wood. Can we lay the brick directly over the wood?—W.A. Wood, North Hampton, Mass.

Yes, you can lay brick directly over the wood flooring, although the brick floor will be higher than the flooring in adjoining rooms. Minimize this problem by using paving bricks which are only ¼ to ½ in. thick. Better yet, take up the finish boards, cover subfloor with plywood and lay the paving bricks on this.

Painting acoustical tiles

We have stained acoustical tiles on our basement ceiling. Can they be painted?—George Watkins, Santa Rosa, Calif.

You can paint acoustical tile. Use either a latex or alkyd paint. Just don't apply it too thick. Coat your ceiling only enough to give it a satisfactory covering. This will assure a smooth coat. ★★★

Do you have a home maintenance or repair problem? Send it to Homeowners Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. Letters cannot be answered individually, but problems of wide interest will be discussed in this column. For more home repair and maintenance help, get PM's Home Care Guide, $4.49 postpaid. Send orders to PM, Dept. HCG, Box 1014, New York, N.Y. 10019.

Материал, защищенный авторским правом

Why you should pay $28.99 for something that could wake you up in the middle of the night.

Because now Sears Early One™ Fire Detector can save you $6. Because later who knows what else it could save you?

You might buy the Sears Early One because you can install it easily with just two screws.

Because it's operated by one low-cost alkaline battery (included), so you can put it anywhere in your house. Because it's UL listed. And because right now it's on sale. Regularly $34.99. Now just $28.99. Save $6.

But the best reason of all for buying Sears Early One is that it can detect fire in the very first stage, when invisible products of combustion are building up. Before the flames. Even before the smoke appears.

When the Early One senses fire, it sounds an 85 decibel alarm. When its battery needs replacing, the Early One beeps once every minute for 7 days or more.

Sears Early One Fire Detector. Right now it can save you money. And who knows what else it could save you?

- **Save $5 on AC-Powered detectors. Regularly $29.99. Now $24.99.**
- **Available in the hardware department at most Sears retail stores.**
- **Similar savings in catalog.**

Sears

© SEARS, ROEBUCK AND CO. 1977.

Материал, защищенный авторским правом

Skimping on engine protection is like skimping on a safety net.

When you consider the purchase of a quality AC Oil Filter, consider the job it must do. And compare its price to the important investment you have in your car.

The oil filter is a crucial part of your engine.

Engines wear out on the inside. Moving parts need clean oil to reduce friction, lessen wear. Yet, dirty oil can do just the opposite. It can act like fine sandpaper, grinding down the precious metals.

The cost of a good oil filter vs. the expense of replacing an engine.

And dirty oil does its best dirty work on rings, bearings and other parts that can be very, very expensive to replace.

But good oil filters help fight that dirt and help keep your engine running clean. That's why quality AC Oil Filters make a good investment for your engine.

AC Oil Filters have a strong filtering material that helps trap the abrasives in the oil. It's polyester reinforced to help withstand the high temperatures and pressures in today's engines. And the material is specially folded so more filtering material can be packed in less area.

Depend on a quality AC Oil Filter to get the job done. Your engine deserves quality protection.

In fact, it needs it.

Ask for AC quality. Don't take your engine's life lightly.

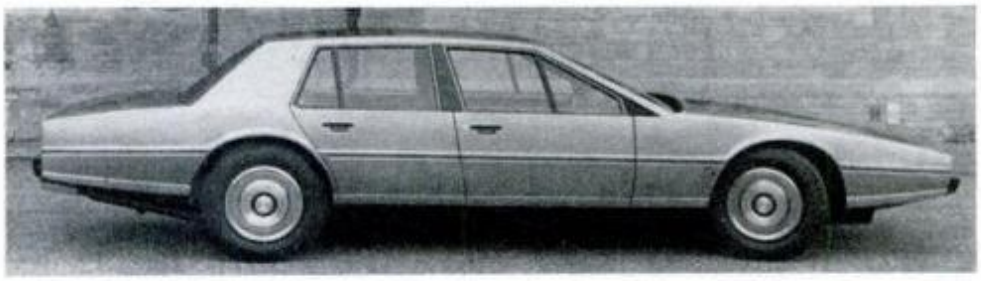
Go with the names you know.

AC-DELCO DIVISION OF GENERAL MOTORS CORPORATION

Материал, защищенный авторским правом

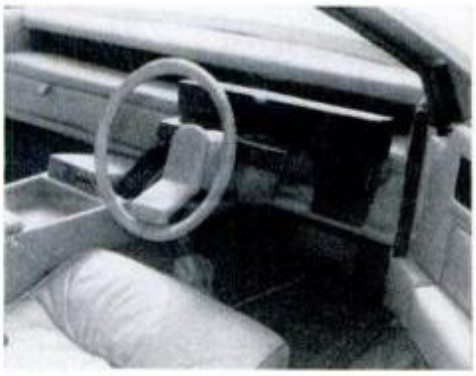
BY BILL HARTFORD

IMPORTS AND MOTORSPORTS



Aston Martin Lagonda

Inertial-guidance navigation is about the only thing missing on Aston Martin's futuristic, four-place transportation capsule. The striking, stiletto-shaped car, now on sale in England, and to be here in late '77, revives the Lagonda marque (the origin of Lagonda is a story in itself: The company was started by Wilbur Gunn who left Ohio and settled in England. His cars, first assembled in 1900, were called Lagonda—a word derived from the



Indian name for Buck Creek near his old home town in America!)

Even more fascinating than the execution of the car's aluminum body is the radical interior. The electronically controlled dash display for the pilot is digital and graphic and initiated by touch switches. It may take astronaut training to fathom some of the readouts, like those for average and instantaneous speed, fuel consumption, elapsed time and distance. Even Neil Armstrong might just

ignore all that, check the date on the digital clock, adjust the position of the pedals with the steering wheel switch and head down to the corner for a loaf of bread.

The Lagonda is a luxury car, but one with real performance. You get 0 to 60 in 7 seconds and a top speed of 140—hardly escape velocity but fast enough for most mortals. Aston Martin's 5.4-liter V8 gives the kick, while four ventilated discs and special, 7-inch-wide GR 70 VR 15 radials bring you back to earth fast —but not fast enough to require a "G" suit. It's the price that's high G's: 24 of them. Aston Martin Lagonda in the United States is at Box 358, 650 Clark Ave., King of Prussia, Pa. 19406.

New MGB dash

At the low-price end of England's range of sporty cars is British Leyland's $5000 MGB. The old design gets some nice refinements for '77: Two electric fans replace the belt-driven fan, front and rear antiroll bars are added, full carpeting is standard and there's more. But the change I especially welcome is the revised interior. As shown above, the steering wheel is new, too.

1977 280-Z

The Z-car or Zed, however you want to refer to it, has achieved such popularity since its introduction in 1970 that it's hardly necessary to identify it as a Datsun, but that's what it is in case you didn't know. The '77 edition gets quite a few new features. An optional five-speed overdrive transmission leads the list. Also new are the bumpers and wheel covers (shown below), hood slots and a space-saving spare tire. At the controls you'll notice new radio, seat coverings, padded armrest on the lidded console and other amenities. And Zs—in coupe or 2+2 versions—are still pretty good values starting at $7000 and $7800, respectively.

World's first motorcycle

I love this old wood-frame two-wheeler and always stop by the Mercedes-Benz museum to see it whenever I'm near Stuttgart, Germany. Gottlieb Daimler's dream machine was first ridden in 1885, powered by the ½-hp, air-cooled Single developed by Daimler and his engineer, Wilhelm Maybach. Daimler even had a go-in-snow version that was to have a front runner and a cogged rear wheel. That one was never built, but it's fun imagining what a 1977 Mercedes-Benz snowmobile would be like! ★★★

Материал, защищенный авторским правом

ANOTHER GOOD STEER FROM A TILT-WHEEL USER

We liked the Tilt-Wheel on our '74 Chevelle station wagon so much, that we had to have it on our new van!

John P. MacLean
Milton, Mass.

That's the way it goes, Mr. MacLean. Once people try Tilt-Wheel Steering, they don't want to be without it. For a lot of reasons.

Tilt-Wheel is so convenient. It moves up out of the way to help make getting in and out easier. Then, you can adjust it to your most comfortable position. You can even change the position of the wheel while you drive, which makes long trips more relaxing.

And Tilt-Wheel adjusts to every driver, no matter how big or how small, no matter what their shape or size.

THE EQUALIZER

In addition to Tilt-Wheel Steering, there's also Tilt & Telescope Steering. It moves in and out as well as up and down, for even greater comfort and convenience.

See your General Motors dealer and check out Tilt-Wheel Steering. It's available on GM cars, light-duty trucks, vans and suburban vehicles.

Saginaw Steering Gear Division
General Motors Corporation

Saginaw GM

Материал, защищенный авторским правом

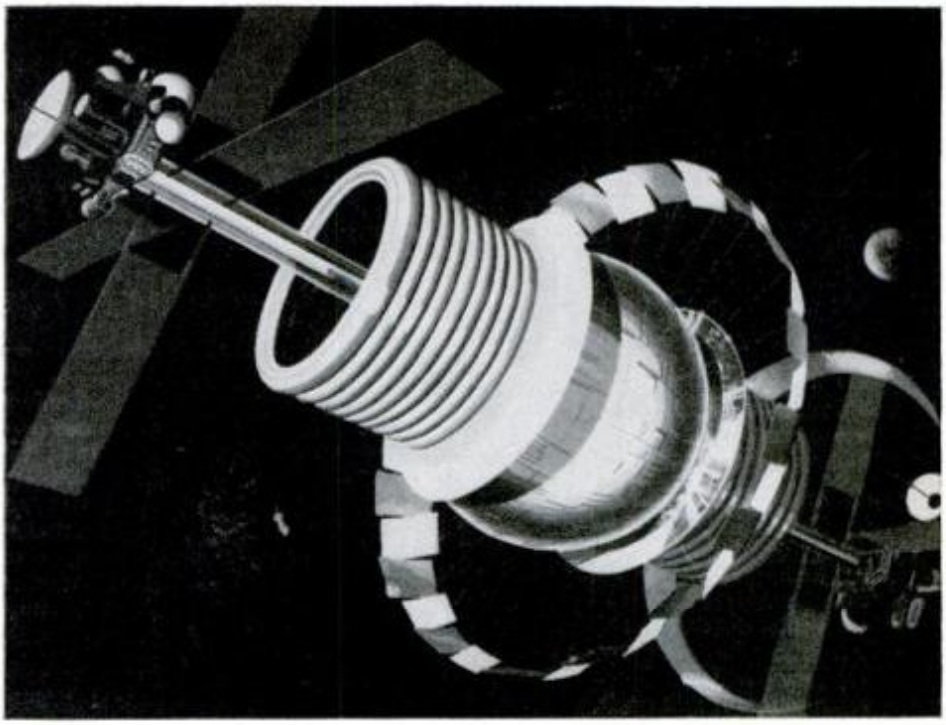
IT'S NEW NOW

Electric mini-ambulance

Life-saving version of golf cart is for places big ambulances can't go. It carries everything from stretcher to electrocardio telemetry, and is manned by a medic and driver. Medical Safety, 420 West Acacia, Stockton, Calif. 95203.

Sideways wind turbine

Vertical wind scoops spin this power-generating windmill, designed for city rooftops and other limited spaces subject to erratic winds. Unit is not affected by wind direction and circumvents load hazards present in horizontal driveshafts and gearing on conventional windmills. It's 13 feet high, develops 1 hp in 12-mph wind. Murray Naergar, 35 Tais, S. Perth, 6151 Western Australia.



Space manufacturing colonies for NASA

Outer space habitats for as many as 10,000 people have now been proposed by the National Aeronautics and Space Administration. The preliminary design above, an adaptation of plans reported earlier in PM (see Cities in the Sky, page 94, May '75), is part of a just-completed NASA study on space manufacturing. The habitats would be used by a workforce living on the inner surface of a one-mile-diameter rotating sphere, shielded against radiation. The sphere revolves to produce artificial gravity similar to Earth's. Crops would be grown outside the shielded area. Docking and zero-gravity industrial areas are located at each end. The structure would be assembled in space from material mined on the moon.

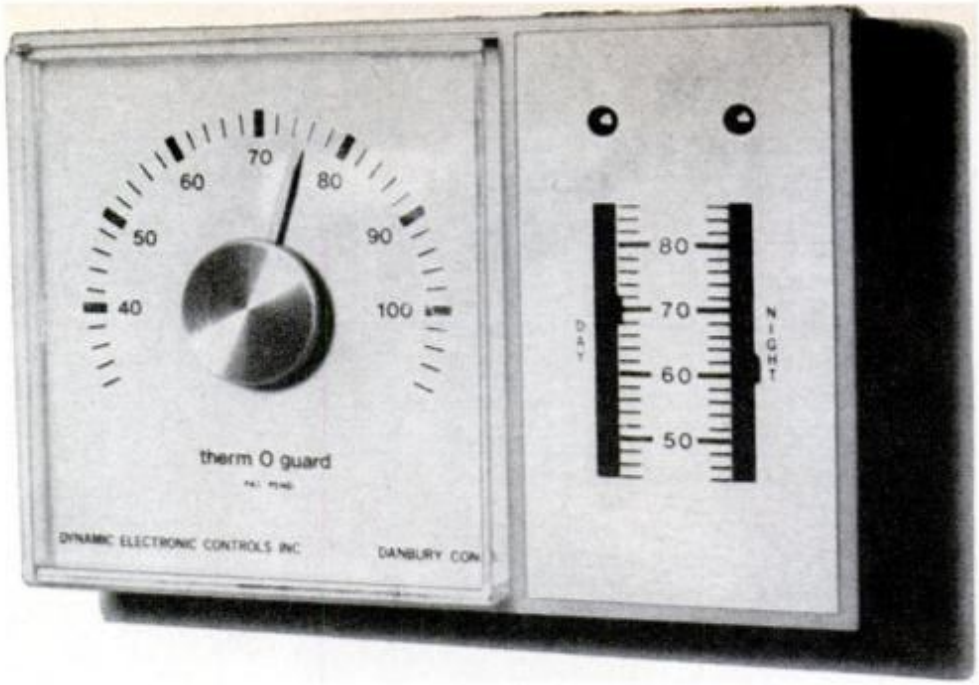
Tool for tight spots

New high-speed flexible-shaft tool from Dremel has fingertip control for precision grinding, sanding, drilling, carving, engraving and other delicate operations. It takes standard Dremel assessories, is $59.95 at hobby and hardware stores.

Drawer kits for easy assembly

If you shy away from the work of making drawers from scratch, you can easily put together these precut drawers with only a hammer and screwdriver. They mount in metal frames with nylon rollers for smooth sliding and come in four sizes from 6 by 16 inches up to 8 by 24 inches. Fronts are available in three styles. Prices from $30 to $42. Drawerkit Sales, Box 36, Alden, Mich. 49612.

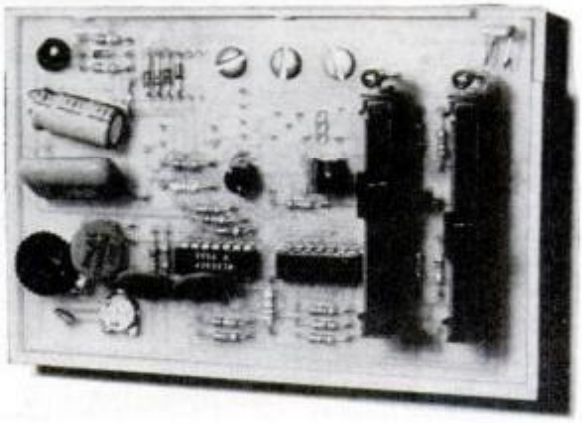
You control the light-sensitivity adjustment which automatically switches between the independent day and night thermostat scales. You can cut the price by building the kit board.

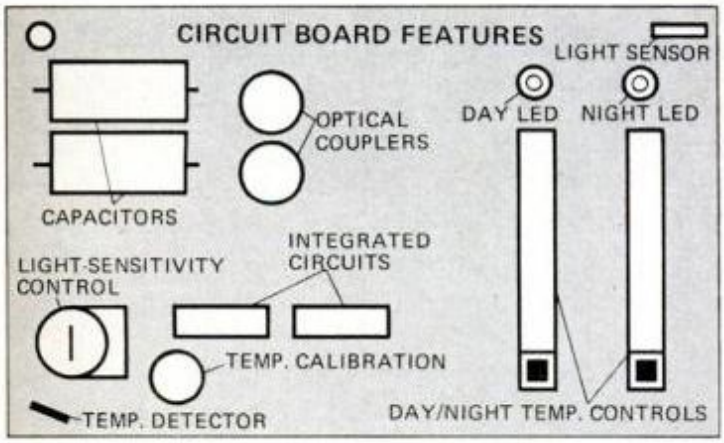


HOW TO ORDER KITS

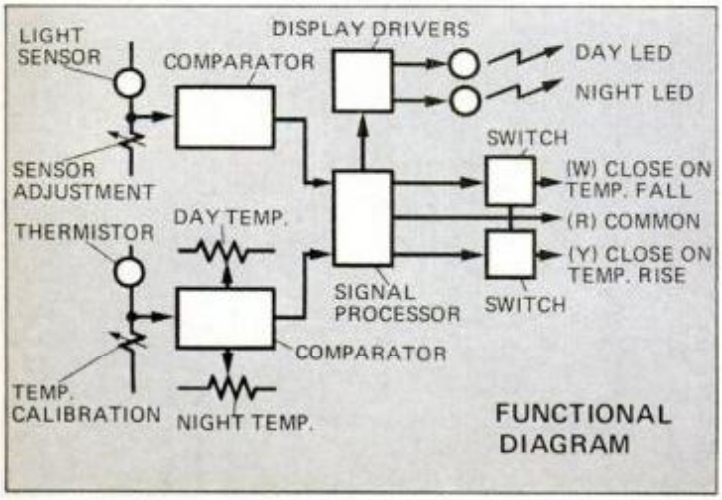
You can order the thermostat in kit form or fully assembled. The kit ($54.95) comes with assembly instructions and all components for the circuit board. The set-up unit is $79.95. Send your order to Popular Mechanics, Dept. TH, Box 1014, Radio City Station, New York, N.Y. 10019.

A smart thermostat you build from a kit





In high light, the comparator signals the digital processor to to select output from the day-temperature comparator. In reduced light, the night comparator activates the lower night-temperature setting. The electronic circuit board (above right) is screwed to a mounting plate on the wall.



An easy way to save heat energy is to turn your thermostat down at night and back up in the morning. It is sensible but results in your going to sleep and waking up in a chilly house.

This unit, made by Dynamic Electronic Controls, Inc., 41 Kenosia Ave., Danbury, Conn. 06810, can cycle your heating system *without* a complicated clock-timing mechanism. Instead, a light-sensing cell automatically switches between day and night modes that have independent controls you can set in advance.

The unit is sold for $79.95 (or $54.95 if you buy it in kit form) so it pays you to put it together. The kit will take you a few hours to assemble and instructions are included for setting up the circuit board.

We installed the unit in a matter of minutes. First, disconnect the power supply and be sure to mark the old thermostat wires as you detach them. If you get mixed up, you can refer to the instructions with the unit which include typical wiring diagrams for gas and oil heating and cooling systems.

The light-sensitivity adjustment controls the level of light (from any source) required to trigger the setting on the day scale. For example, you can adjust the sensitivity so a little light from a bedside lamp will activate the day setting. Turn the lamp off and the furnace switches to the lower night setting. Unlike a preset clock thermostat, this system responds to your living habits, even if they change from day to day.—*Mike McClintock, Home and Shop Editor*

Материал, защищенный авторским правом

Portable 200,000 CANDLEPOWER SUPER SPOTLIGHT

Turn night into day! More powerful than most airplane landing lights. 5 times as powerful as car headlights. Gives off wide angle mile long beam. Actually gives more light than the distance requires. Dozens of uses: Drivers, boaters, campers, emergency, etc. Features: sealed beam lamp; on/off switch; 10-ft heavy duty cord; cigarette lighter-type plug; UL listed; 2-3 hours constant use with motor "off"; Plugs into any car, truck, boat cigarette lighter. 10" long, 5¼" diameter.
☐ 4037. Super Spotlight $15.95

JR01 Electric Computer

Solve Problems. Learn Data Processing. Helps you win games of chance such as cards, dice, betting, etc. Play games of logic and strategy. A true computer in miniature developed and made by Electronic Data Controls Corp. in conjunction with Honeywell. Easy to program. Fun to operate. Learn principles of full-scale electronic computers. Heavy duty, 2-color molded plastic unit, 16x15x3". Battery operated. **Originally sold for $34.95, now offered in easy-to-assemble set for only $9.95.**
☐ 6512. Electric Computer $9.95

MAGNET LIFTS,100 POUNDS!

Lifts up to **100 Pounds SOLID STEEL! Even more underwater. GO TREASURE HUNTING.** Do amazing stunts. 1001 uses. Newly developed alnico. Pocket size.
4005. Lifts 50 lbs. ... $1.95
4055. Lifts 100 lbs. .. $3.50

1000 TINY MAGNETS

Fantastic fun bargain. Do tricks, stunts, experiments. Arrange in millions of patterns. Stick together with own power. Easy to change. Each 1/8x1/8x1/16".
2008. 1000 Magnets $1.49

1001 THINGS FREE

Get FREE articles, novelties, books, stamps, coins, show tickets, games, films, products, maps, toys, food-drug samples, science materials, records, jewelry, hobbies, travel info., etc. Mammoth directory of over 1000 free offers with names and addresses.
☐ 1018. "Things Free" Directory ... 89¢

ELECTRIC MOTOR

69¢

Surplus Bargain. Fast. Powerful. 2500 rev/minute. Drive cars, boats, planes, models, experiments, pumps, mixers, etc. Self-starting. Ready to run. Reversible. Runs on 1 battery. ☐ 4920. 69¢. 3 for $1.95

Sun Battery & Solar Cell

Generates electricity from light. Powers radios, motors, lights, etc. No batteries necessary. Also use as a powerful photocell or electric eye. Turn lights on or off, operate electric appliances, open or close doors, etc. Get several for added power.
☐ 4924. Sun Battery (3/1.75) ..... 65¢

Have Fun & Entertain

Bargain Price $2.95

Ventriloquist Dummies

Full length 16-inch dummies with control to operate mouth & move head. Learn to throw your voice & entertain friends. Make them sit, stand, even dance & act alive! Fully dressed in colorful clothing. Moulded plastic. Natural finish. Movable arms & legs.
6156. Archy The Dummy $2.95
6075. Dumbo The Clown $2.95

Automatic Switch - Action Comb

$1.49

Zip! Zip! Just push button & comb flips out of protective case. Locks automatically. Retractable blade gives you longer, sturdier, cleaner comb as well as convenient pocket size. 7½" overall, 4" closed.
4905. Switch Blade Comb $1.49

Live Sea Monkeys $1.25

Hatch entire family of exciting pets in 5 minutes. Watch them grow, play, etc. Easy to care for. With year's supply of food, complete handbook of tips.
☐ 3760. Sea Monkeys Complete Set $1.25

Hand Timer 98¢

IMPORT BARGAIN – WHILE THEY LAST.

Fun timer for non-professional events such as model races, sports, etc. Full pocket-watch size with chain link. Spring operated. Start and stop button. Sweep hand. Calibrated dial.
2020. Sports & Hobby Timer ..... 98¢

WITH HAIR! Rubber Masks

"Comes To Life"

Natural, life-like, horrible! Thin latex rubber. Clings when worn. Amazingly realistic.
☐ 4637. Wild Cave Man $3.95
☐ 4717. Savage Gorilla $3.95
☐ 4633. Realistic Frankenstein $2.95

Planet Of The Apes Mask

Professionally made. Realistic in every detail. Covers full head. Realistic hair over entire head. Swollen red lips. Facial warts. Flattened nose. Deep set eyes. Clings when worn. Thin, moulded latex rubber.
☐ 4999. Deluxe Ape Man Mask ... $9.95

Midget Radio $1.95

Pocket self powered radio with dual tuner. No batteries. No plug. Ready-to-operate. Pulls in radio waves from air. Listen almost anywhere. With private earphone. Size of cigarette pack.
☐ 6608. Pocket Radio $1.95

Joke Gum

Pucker Gum. Putrid.
☐ 2738. Pkg. of 5 ... 30¢
Red Hot Gum. Blazing.
☐ 2724. Pkg. of 5 ... 30¢
Garlic Gum. Awful.
☐ 2735. Pkg. of 5 ... 30¢

1001 Insults, Putdowns, For all Occasions

79¢

A putdown, barb, wisecrack or snappy comeback for every occasion. Find one to fit every situation, every type person.
☐ 1171. Insult Encyclopedia ..... 79¢

SLOT Machine BANK

Las Vegas Replica. Take a chance. Insert coin, pull "one arm bandit" and watch dials spin. Big payoff if you hit! Collect money for your bank. Smooth action. 6" high. Not for gambling.
4082. Slot Bank $4.95

Unbeatable Self Defense

95¢

Learn Judo, Jiu-Jitsu, Boxing, Wrestling, Muscle Building, Self Defense Tricks. Well illustrated, easy to understand paper covered books. Up to 95 pages long.
☐ 1265. 50 Tricks of Self Defense ..... 95¢
☐ 1056. How to Build Mighty Muscles ..... 95¢
☐ 1271. How to Box ..... 95¢
☐ 1266. Combat Judo ..... 95¢
☐ 1267. Professional Wrestling Methods ..... 95¢

$4.49 AIR CAR

HOVERCRAFT — RIDES ON AIR

New HOVERCRAFT glides like magic over floors, sidewalks, EVEN WATER! Sleek car of the future uses principle of air suspension to ride on cushion of air above most any surface. Colorful plastic, 8"x9"x2" high. 4" propeller. 48" control line from push button remote control unit. Simply press switch and this beauty rises and floats in any direction you wish. **Illustrates frictionless motion principles of full size experimental vehicles already in use.** Not a kit. Ready-to-run except for 2 "D" batteries (not included).
☐ 7606. Hover Craft $4.49

Deluxe Electric Shock Pen

When they borrow your expensive looking ball point pen it causes the sparks to fly. They push the button and **THEY GET ZAPPED!** The looks and feel of finest pen on market. **Wear in pocket or leave on desk, ready for your next "victim". Never fails. Teaches "snitchers" a lesson.** Expertly made by West German craftsmen. Deluxe in looks & results. With replaceable battery inside.
☐ 2965. Shocking Pen $9.95

WIRELESS RADIO CONTROL RACER

Only $24.95

Best mail order ever in radio control cars! Beautiful scale reproductions operate without wires or tracks. You direct movement with wireless hand-held control unit. Available in 2 sleek models: Gran Prix Porsche & Corvette Stingray. Features include: Instant response handling; 2 speeds; single channel radio control; 50-ft. wireless indoor range; 100-ft. wireless outdoor range; hand lacquered body; authentic styling; high-impact plastic body & transmitter, manufacturer's warranty. Not a kit. Comes ready-to-run except for batteries (2 "AA", 2-9v). Each about 7", 1/24 scale.
☐ 9515. Gran Prix Porsche ... $24.95
☐ 9519. Corvette Stingray $24.95

Star Trek Phaser Set

Authentic replicas of Star Trek instruments.
PHASER: Pistol energy weapon. Emits pulsating beam which dematerializes, disrupts.
TRICORDER: Portable sensor/computer/recorder with midget TV screen.
COMMUNICATOR/LOCATOR: Used between satellites, planets, space ships. Detailed models. With assembly instructions.
☐ 7662. Exploration Set $2.95

GIANT BALLOONS

Capable of Tremendous lifting power. Do entertaining stunts, advertising effects, science fun. See for miles. 24 ft. around.
3010. 8 ft. Balloon $2.95

Secret Book Safe

Looks like attractively bound book but opens to reveal combination lock safe. Keep valuable papers, jewels, money, etc. hidden away. 4x6x1½".
☐ 4012. Book Safe $1.69

Electric Sound Switch

SURPLUS BARGAIN! ONLY $1.95. Turns on lights, bells, horns, sirens, alarms, tape recorders, wireless mikes, etc. Operates by voice, whistle or any sound from across room. Do mysterious tricks & stunts. Great for experimenters, electronic bugs. **NOT A KIT. 2 for only $3.00**
☐ 6561. Voice Command Switch ... $1.95

Star Trek Coin Medal

Official coin in beautiful jeweler's bronze. Spock, Kirk on one side, Enterprise on reverse. **LIMITED EDITION MINT NUMBER.** Hand engraved, finished. Silver dollar size. Available with matching 24" neckchain-holder.
☐ 5711. Star Trek Coin $4.95
☐ 5715. Star Trek Coin & Neckchain $5.95

Handcuffs

$4.95 Police Style

Regulation size and style. Heavy duty, steel, with lock and keys. Chrome plated.
☐ 5043. Regulation Style Handcuff $4.95
☐ 5048. Handcuff Case $1.95

Pocket Spy Telescope

Powerful, yet fits pocket like pen. Magnifies 64 times, area 8 power. Attractive finish. Specially priced import bargain.
☐ 6724. Spy Scope $1.59

ELECTRIC POLICE SIREN & FLASHLIGHT

$2.95

Powerful beam flashlight. Loud, ear-piercing siren. For protection, fun. Heavy duty.
☐ 3034. Police Siren Flashlight $2.95

Midget Spy Camera

$1.49

Take secret or regular pictures. Size of pocket watch. Conceal in hand. Imported bargain. Solid metal construction, chrome trim, view finder. 2½ oz. Takes ten pictures on each roll.
☐ 4899. Camera (without case) ... $1.49
☐ 4891. Film 3 Rolls (30 Pictures) ... 75¢

Flying Helicopter Goes Up To 100' High!

$1.50

Flying authentic replica of helicopter used by armed forces. Giant 16" wingspread. Goes up to 100 feet high. High impact plastic.
☐ 2065. Flying Helicopter $1.50

Crime Detection Lab

Modern Mini Scientific Crime Lab. Chemical crime detection. Similar tests used by FBI, police. Fingerprinting, fiber identification, flame tests, etc. Carrying case and instructions.
☐ 6443. Crime Lab $3.25

Midget Microphone Transmitter

Tiny carbon microphone picks up sounds almost anywhere. Use as sound detector, phono pick-up, amplifier, telephone, etc. Complete except for battery & earphone or speaker. Instructions, experiments included.
☐ 2988. Midget Carbon Microphone $1.39

Electric Laughing Bag

Roars with Laughter! Happy, hilarious joke, gift or surprise. Battery operated. Lasts indefinitely.
3070 .. $3.95

Pocket Radio & Transmitter

Broadcast Talking, music, etc. over regular AM band. Also receive all AM radio stations. Complete with speaker & microphone. Wired, just connect & use. Also use as walkie-talkie, intercom, dictaphone to monitor sounds in remote places, etc. **Surplus bargain (was $20.00).**
☐ 6259. Each $5.95 ..... 2 for $10.95

Surprise Package $1.00

Pleasant surprise and bargain. Fun or useful. Includes new samples, factory surplus, special novelties, etc. Most worth much more. Money back if not delighted.
2997. Surprise Bargain $1.00

Dog Whistle $1.00

Ultra-sonic range. Dogs respond instantly as if by magic. Used by dog trainers. 4591 ... $1.00

SECRET SPY MIRROR—$1.25

See without being seen. Convert any window into secret spy mirror. Amazing poly-acetate sheet acts like mirror on one side & as regular window from other side. Trim to any size. Use tape, glue to apply to glass. **For larger areas use 2 or more sheets.**
☐ 3265. 5x8" (40 sq.") $1.25
☐ 3269. 10x16" (160 sq.") $1.95

Secret Pocket "Pen" Radio

$2.59

Listen almost anywhere! Slips into pocket like ordinary pen. Tiny earphone for private listening. Pulls in radio waves from air. **NO BATTERIES NEEDED.** Ground wire included for best reception but will work without grounding. Guaranteed to receive several stations, although reception will vary from place to place. **Hear SPORTS, MUSIC, NEWS, etc. in office, school, bed, etc.** Solid-state circuit. Complete, ready-to-play. ☐ 7052. Spy Pen Radio $2.59

X-RAY VISION

$1.00

Greatest illusion of the century! Apparently see bones thru skin, see thru clothes, etc. Amaze and embarrass everyone! Regular size glasses with built in optical illusion.
☐ 3762. XRAY Specs Only ..... $1.00 per Pair

U-Control 7-Foot Life-Size GHOST 95¢

Use With Horror Record 3140 – 95¢

Use Indoors & Outdoors Acts Life-Like

You control in secret. Ready to operate. Rises, falls, floats, spooky effects, darts, dances. Includes inflatable head & white shroud "body" (about 7-ft. overall) with near invisible 50-ft. control line. Includes detailed instructions.
☐ 3747. Ghost ..... 95¢

Red Flasher Light

$1.95

Police Style Warning Light. Big dome flashes on & off in bright red light visible for away. With suction cup base. Sticks tightly to any smooth surface like top of car. Runs on flashlight batteries. About 4".
7655. Flasher $1.95

Motorized Submarine

$1.95

Sturdy 7½" plastic submarine cuts through water powered by battery operated heavy duty underwater motor. Runs on pen-cell battery. 5" motor is waterproof sealed, with adjustable rudder & built in switch.
2992. Submarine $1.95

Scientific Lightstick $1.69

Ideal Emergency, novelty, scientific light. No electricity or batteries to run down or wear out. No flames. Works underwater and almost any other conditions. Produces 3 hours of useful light & sufficient marker light for 10 more hours. 6" long. Weighs less than 1 oz.
4368. Lightstick $1.69

TWO HEADED NICKELS $1.95

Real nickels with heads on both sides. Fool your friends. **Not to be used for gambling!** Also available: real nickels with 2 tails.
☐ 5975. 2 Headed Nickel $1.95
☐ 5976. 2 Tailed Nickel $1.95

GREEDY FINGERS BANK $2.49

Automatic Mechanical Pickpocket. Great Money Maker! Place coins on coffin & gravestone green hand with eerie bone fingers appears like magic from the grave to snatch them.
☐ 3021. Greedy Fingers Bank $2.49

Pocket Calculator 99¢

Add, subtract, Multiply Exactly in Seconds! Registers up to 9,999,999. Only 3 x 5 inches, 7 ounces. Metal. Ideal for school, home, office. **Be a math whiz.**
☐ 2376. Rapid Pocket Calculator ..... 99¢

Hypnotism Record

Hear a hypnotist in action. 7" 33 LP is example of how people are hypnotized. **Side 1:** Individual & group hypnotism. **Side 2:** Self-hypnotism.
☐ 3282 Hypno Record $1.50

BLUE MAX MEDAL

Imperial German's Highest Award for Bravery. Beautifully made in gold finish with gold lettering. Over 2" high. With neck chain.
☐ 8942. Blue Max Medal $2.50

WORLD'S SMALLEST TRANSISTOR RADIO

Micro-Mini AM Radio. Only 1½" high, 1½ ounces! Electronic marvel! **Excellent reception guaranteed.** Receives several stations in most areas. So small you can put in pocket, purse or even wear on keychain. Take anywhere to listen to music, news, sports. **Runs for up to 100 hours on 2 tiny easy-to-find hearing aid batteries (included). Ready for instant use.** Dial tuner. No antenna required. Earphone (included) acts as on-off switch. With handy keychain.
☐ 6053. Mini AM Radio $12.95

Free 1977 Catalog 1600 Novelties

World famous catalog of novelties, pranks, jokes, mod items, cloth patches, hobbies, scientific supplies, funmakers, planes & boats, gadgets, time-savers, photo & optical goods, jewelry, disguises, music items, stamps, coins, puzzles, fortune tellers, radios, bikes & accessories, telescope, banks, office & artist supplies, engines, motors, sports, books.

☐ Yes – Send Me Your Catalog. I have enclosed postage.

SEND 10¢ FOR MAILING. CANADIAN RESIDENTS SEND 25¢

JOHNSON SMITH COMPANY
Dept.102, 35075 Automation Dr., Mt. Clemens, Mich. 48043

How Many	Item Number Only	Total Price

No C.O.D. Send check or money order. All orders up to $3.00 add 59¢; over $3.00 add 99¢ shipping/handling. Canadian & foreign orders add 20¢ extra for each dollar ordered. Use any extra paper if needed.

ADD HANDLING
CATALOG
TOTAL $

Print Name

Address — Apt. #

City

State — Zip Code

Mail Orders For Items On This Page To:

Johnson Smith Co.

Dept. 102, 35075 Automation, Mt. Clemens, Mich. 48043

Money Back Guarantee

© JSC 1977 Reproduction Prohibited

Материал, защищенный авторским правом

You've never tried Sebulex.® You still see dandruff. There could be a connection.

There's only one way to judge how effective a dandruff shampoo can be for you.

Try it.

You've probably tried the leading brands. But, if you haven't used Sebulex,® you may have overlooked the one shampoo that works best on your hair and scalp.

Doctors recommend Sebulex for dandruff

When we asked over two hundred skin specialists what product they usually recommend for patients with dandruff or scaling of the scalp, the word came back—Sebulex.

Four times more than the leading dandruff shampoo.

Seven times more than the next largest selling dandruff brand.

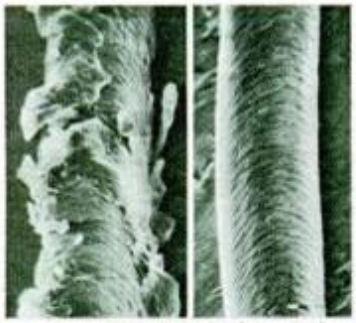
If you're out to control your dandruff, to help stop the oiliness and itching, use what more doctors recommend—Sebulex.

Sebulex cleans away everything in sight

Extra strength cleaning agents in Sebulex penetrate, peel and float away dandruff. They carry medication down to the scalp and follicles of the hair to quickly relieve flaking and itching.

You come away from a Sebulex shampoo with hair that's fresh and really clean, right down to the roots.

And with regular shampooing, it will stay that way.



Magnified hair before and after washing with Sebulex.

A low pH factor

Sebulex has the lowest pH of the leading non-prescription dandruff shampoos.

That's because it contains a special combination of medicated ingredients. They could be the key to the dandruff control you're looking for. Try the medicated action of low pH Sebulex.

All you have to lose is your dandruff.

Effective dandruff control, pleasant to use

The first thing you'll notice is the thick, rich consistency of Sebulex right out of the bottle.

Sebulex builds to a concentrated, creamy lather that really gets dandruff off your back.

Clean, fresh scent

Some people think that a hard working medication can't smell good. Well, Sebulex has a clean, fresh scent that won't advertise that you're using a medicated shampoo. Even when you're up close.

The real proof

This Sebulex story is only proof for the inside of your head.

We'd like to prove it to you on the outside.

Buy Sebulex. Shampoo in the Sebulex medicated lather and look at your hair when it's dry.

That's where we shine.

Clean, green sebulex® recommended by specialists

©1977 Westwood Pharmaceutical Co., Inc.

Материал, защищенный авторским правом

Direct-drive turntable changes records, too

There are lots of direct-drive turntables around, but only this one —the Technics SL-1350—changes records.

Direct-drive combines the turntable platter and the rotor of the driving motor into one assembly, so there's just one moving part for greater reliability and fewer bearings to rumble. Since the motor turns at the same speed as the record—33⅓ rpm instead of the 1800 rpm of most turntable motors—the rumble frequency is down so low you can't hear much of it, either.

Without the momentum of a fast-spinning motor to stabilize them, direct-drives have to use electronic speed control—which turns out to be even more precise, yet makes variable speed easy to design in.

All those virtues, common to many single-play turntables, are unique to the SL-1350 among changers. And it has another virtue no other changer has: It uses the same cartridge shells as most other Japanese arms, so you can swap cartridges between the SL-1350 and your other, manual turntable if you have one (that's an Audio-Technica head it's wearing here, but I had to bend the finger lift down so it wouldn't scrape the bottom of the next record during a change cycle).

I couldn't fault its performance in any respect. But it could use a muting switch, so you don't hear the platter slow a fraction just before the arm is lifted off. And I'd like to see them move one switch (see caption below) to make it more convenient.

—*Ivan Berger*

Technics SL-1350 is the world's only direct-drive record changer. Unfortunately, you have to set the number of records you're going to play—and the dial for that is way back behind the other controls.

PM photos: Madeline Silver

Get More from Your Car with a Mark 10 System.

The best-selling CDI system of its kind in the world—now at discount prices!

Would you like more power? Better mileage? And could you stand to eliminate 3 out of 4 of those expensive tune-ups? Well, that's what the MARK 10 capacitive discharge electronic ignition system is all about. Very simply, it boosts the spark to your engine—promoting better combustion, and minimizing combustion contaminants. Spark plug life is extended, all-weather starts are insured, and you can feel an increase in acceleration and overall engine performance—*no matter what kind of car you drive.* Learn more about a MARK 10 CDI system for your car (and take advantage of year-end discount prices), when you write today for a catalog and price list.

DELTA PRODUCTS, INC.
P.O. Box 1147, Dept. PM
Grand Junction, CO 81501
(303) 242-9000

I want to know more about Mark Ten CDI's. Send me complete no-nonsense information on how they can improve the performance of my car.

Name _____

Address _____

_____

City _____ State _____ Zip _____

Материал, защищенный авторским правом

The art of making briar pipes

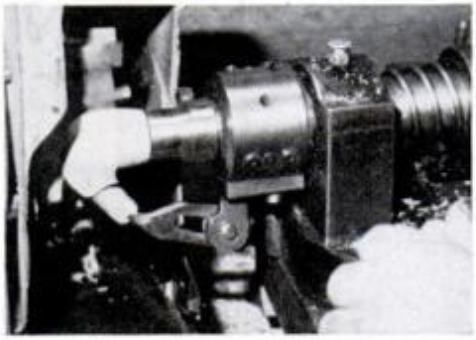
by John A. Linkletter

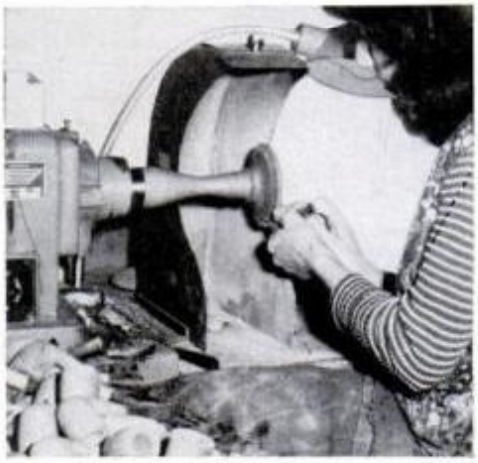
PM photos: Pierre Caty

A complete briar root, as it looks when it's taken from the earth, is displayed by pipemaker Jacky Berrod. Behind him are heaps of briar blanks cut from root. The blanks will be air-dried for three to six months before they're ready to become pipes.

The square outline of the briar blank is still apparent as the top of the pipe bowl and the stem begin to take shape.

Lower portion of the bowl is shaped, followed by removal of wood left between turning operations. Then stem is bored.





With mouthpiece fitted, each pipe goes through a variety of sanding and polishing steps. Skilled women do this work.

Pipemaker Pierre Morel is noted for his hand-carved creations that often retain knobby surface texture of the briar root.

To anyone who regards his briar pipe as a companion without equal and a source of comfort, the half-century it takes for a briar root to reach maturity and the months spent in turning the root into a pipe seem not too long a time to wait for that mellow product.

And even after those decades, according to Jean LaCroix, a master pipemaker of Saint-Claude, France, "We will make 10,000 pipes to get the absolutely perfect one."

Saint-Claude, which loyal pipe smokers might regard as their personal Mecca, is a town of 15,000 in the High Jura mountains near the Swiss border, where some 5 million briar pipes are produced annually by more than 1000 artisans working in large and small factories and their homes.

The town's tradition of woodcarving goes back to the Middle Ages. It wasn't until 1857, though, that the first briar pipe was carved there from briar root brought up from the Mediterranean area.

The bush must be at least 50 years old for the root to have reached the maturity needed for pipemaking. The search for aged briar is strenuous—through dense countryside thickets of such lands as Greece and Corsica—and it leads to another difficult job: cutting away the branches of the plant and extracting the root. The root can be taken only from late October to April; otherwise, the earth is too hard and dry.

Keeping the root damp so it won't split, the suppliers cut it into *ébauchons*—rough blanks that approximate the final shape of the pipe as determined by the grain of the briar. The blanks are boiled in water to remove the sap, then shipped to the French pipemakers.

There, visitors can see thousands of blocks—averaging about 3 by 2 by 1½ inches each—air-drying in darkened storerooms, a process that takes three to six months. Once dry, the blocks are selected by size for the model pipe to be produced—and manufacturing begins.

■ Calibrage, the first step, is

(Please turn to page 38H)

Материал, защищенный авторским правом

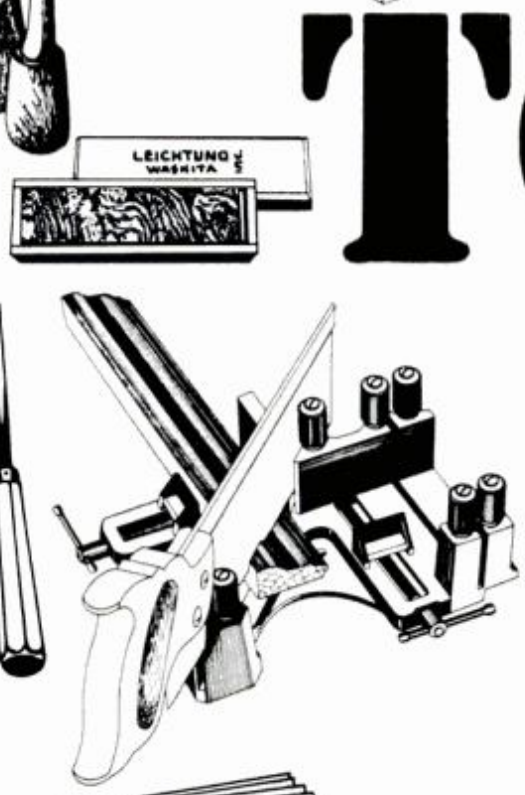
DENMARK GERMANY SWEDEN ENGLAND UNITED STATES THE WORLD!

WOODWORKING

TOOLS

FROM

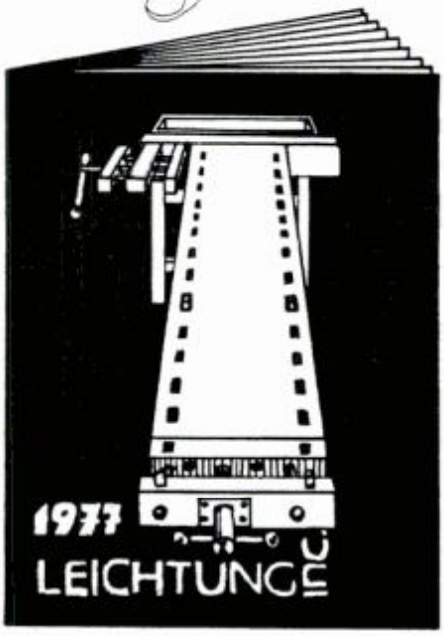
LEICHTUNG INC.



Tools *can* make the difference.

You *can* do better work with the right tool for the job.

Treat yourself to the pleasure of owning the world's finest. If they come from Leichtung you know your tools are the best from the great tool centers of the world.



Yes, Ric Leichtung,

☐ Please send me **FREE** your full-color brochure on Lervad's complete line of benches.

☐ Enclosed is $1.00. For this, send me the full-color brochure on Lervad benches, your newest catalog of fine, hard-to-get tools **PLUS** all catalogs, brochures and new-tool bulletins **FOR THE NEXT TWO YEARS!**

Name _____

Address _____

City _____ State _____ Zip _____

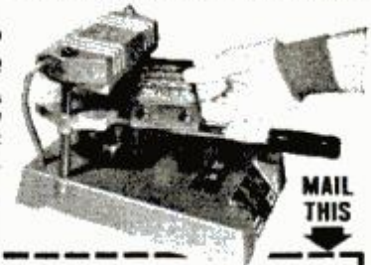
Mail to: **Leichtung, Inc., 701 Beta Drive, Suite 277, Cleveland, OH 44143**

Материал, защищенный авторским правом

NEW RUBBER STAMP BUSINESS PAYS BEGINNERS UP TO $16.50 AN HR.

Start at Home in Spare Time

THIS LITTLE TABLE TOP MACHINE MAKES EVERYTHING SIMPLE & EASY



The multi-million dollar Rubber Stamp business—once controlled by a few big companies—is now being taken over by small operators—one in each community throughout the United States. Men and Women who have this inexpensive machine can turn out huge quantities of Rubber Stamps with special wording that buyers once were forced to buy from big cities. Material costing only 27c makes a stamp that sells for $2.75. The machine that does the work is simple and easy to operate and it turns out as many as six Rubber Stamps at a time, each with different wording such as names, addresses, notices, stock numbers, prices and other "copy" needed by offices, factories and individuals. Working full capacity, it can earn as much as **$33.00 an hour for the operator!** Now you can get into the big-pay business yourself, with your own home as headquarters. You don't need experience. We supply everything, including complete instructions and eight ways to get business coming in fast. **We even help finance your start!** Start making up to $16.50 an hour from the very beginning. Cash in on the profitable Rubber Stamp business in your community, right away. We'll mail full particulars FREE and no salesman will call. Be first in your locality. Rush coupon today or send your name on postcard to:

RUBBER STAMP DIV., Dept. R-2-GB
1512 Jarvis Avenue • Chicago, Ill. 60626

MAIL THIS

RUBBER STAMP DIV. **FREE!**
1512 Jarvis Ave., Dept. R-2-GB, Chicago, Ill. 60626

Please rush full particulars about your financing plan and the little machine that can get me started in the profitable Rubber Stamp business at home in spare time. Everything you send me is FREE and no salesman will call.

Name _____
Address _____
City _____
State _____ Zip Code _____

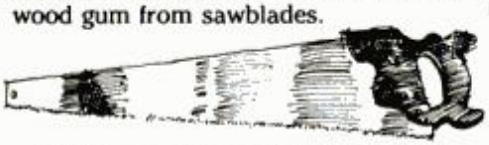
10 more reasons to reach for Bon Ami® Cleaning Powder and Cleaning Cake.

You may think of Bon Ami Cleaning Powder and Cleaning Cake to clean windows and mirrors (it's the original defogger), or to clean grimy hands and whitewall tires. And of course it's great for all those uses.

But add these to your list:

FROM OUR LAB:

Preventive cleaning. Cleaning your tools and other metal surfaces with Bon Ami Cleaning Powder or Cake actually leaves an invisible coating to retard rust and lubricate the surface. Even removes wood gum from sawblades.



Feldspar. Feldspar is the gentle powdered abrasive that makes Bon Ami unique. Feldspar has a hardness of six on the standard Mohs scale. That's hard enough to clean off dirt, paint, and grime, but not hard enough to scratch surfaces like stainless steel, glass, steel, tile and porcelain.

FROM OUR CUSTOMERS:

"We use the (Cake) to prepare surfaces of windows and trucks for lettering." *Mrs. R.F. (Sign painter)*

". . . It is the only product the Michigan Department of Weights and Measures will allow us to use (for calibration of bulk milk tanks)." *J.R.W. (dairy director)*

"I prefer Bon Ami Cake for cleaning the glass on my fireplace doors." *Mrs. L.J., Washington*

"We use Cake Bon Ami to clean microscope slides in our laboratory." *D.L.O. (University administrator)*

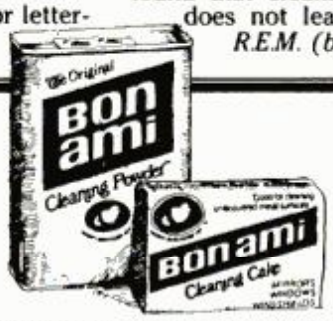
"Bon Ami Cleaning Powder is excellent for cleaning our surgical instruments without scratching them." *K.F.G. (Registered Nurse)*

"I am allergic to many substances. Happily, I have discovered that I am able to use Bon Ami without experiencing any discomfort." *B.R., New York*

"My husband has an auto body shop, and cleaning car windows is best with Bon Ami." *Mrs. R.P., New Jersey*

"Your soap is the only brand we've found that cleans our glassware and does not leave a toxic residue." *R.E.M. (biological researcher)*

The original miracle cleaner.
Unchanged for 90 years.
because it couldn't be better



Your hardware man knows how to help you solve your cleaning problems. Ask him. Nothing does as many cleaning jobs as well as Bon Ami. Look for Bon Ami in your Ace,® True Value,® Sentry,® Pro,® Bluegrass,® Orgill Brothers® and other fine hardware stores.

©1977 Faultless/Bon Ami Company

ART OF MAKING BRIAR PIPES

(Continued from page 38F)

the cutting of the block by circular saw to the necessary height and thickness. In the Berrod-Regad plant, I watched a worker deftly cut the blocks freehand using neither a guide nor a blade guard.

- **Ebauchage** sends the chips flying as the bowl is turned and bored.
- **Varlopage,** the turning of the briar stem, follows.
- **Fraisage,** the elimination of the wood left in between the two turning operations, is done with a high-speed, multibladed cutter. At this point, the stem is bored.
- **Selection of bowls** into groups of various quality results in about 10 percent being discarded. A skilled man with a file can whisk off some obvious flaws and save a few bowls, and a puttier can fill other flaws to make a bowl acceptable. At this stage, a fitter adjusts a mouthpiece to the briar stem.
- **Polissage,** a variety of sanding, buffing and polishing operations, is mainly the job of women, most of whom learned the skill from their mothers, as they did from theirs.
- **Badigeonnage,** staining, is followed by wax (for a shiny finish) or oil (matte finish). After buffing, the pipe is ready to ship.

Yves Grenard, *directeur general* of Chapuis-Comoy, which produces some half a million Chacom pipes a year, states that about 10 percent of those pipes are flawless. They are the top level of the six grades that determine desirability (and price):

First quality: Flawless.

XA: The briar may have two little points (small holes) which require filling.

XF: Three or four points.

II: Called "second quality," these bowls may have four or five small points or one or two larger ones.

III: These "third quality" pipes may have a flaw in the grain up to ½ inch in length.

IV: "Fourth quality" pipes have an obvious fault in the grain. About 10 percent of all bowls are discarded when they don't meet this standard.

Not all pipemakers begin with the precut blank. A smaller producer of highly original pipes, Pierre Morel often carves pipes directly out of uncut root. In that way, he retains the rough, knobby texture of the briar surface as part of the design of the bowls.

In all, some 1600 different pipe styles come out of Saint-Claude, ranging in price from $10 to $150—a full menu for any gourmet of the briar pipe. ★★★

Nearly 400 Great Kit Ideas!

If you haven't seen the new Heathkit Winter Catalog, there's a lot you haven't seen.

WEATHER MONITORS
Including the ID-1490 Digital Electronic Clock/Thermometer — digital time and indoor/outdoor temperatures by the numbers. Also electronic weather stations and wind speed and direction indicators.

STEREO HI-FI
Like the AR-1515 Digital AM-FM Stereo Receiver — outstanding power and the lowest distortion we know of. A broad selection of superb Heathkit hi-fi components and systems.

EDUCATIONAL
Such as our Electronics Learning Programs — Texts, records and "lab" experimenter kits; everything for complete and effective learning. Programs in AC and DC electronics, semiconductors, and digital devices.

INSTRUMENTS
Such as the IM-4100 Frequency Counter — Precision digital accuracy at an incredible low price. Also scopes, function generators and more.

AMATEUR RADIO
Including the HW-2036 2-Meter Transceiver with frequency synthesis and built-in encoder. Transceivers and accessories for any ham's budget.

AUTOMOTIVE
Such as the GC-1093 Digital Car Clock/Trip Timer — totally electronic, accurate to a minute a month. Also a Digital tach, CDI, and more.

COLOR TV
Like the incredible GR-2001 "computerized" Color Television System with a programmable memory that changes channels automatically. And the best picture and sound you'll find anywhere.

HOME PRODUCTS
Including the GD-1183 Freezer Alarm (not shown). Or a "touch control" light switch or lamp dimmer for real convenience and versatility.

Nearly 400 money-saving electronic kits!

We know what you want and we've got it. Kits for every interest. Hobbyist or technician. Casual listener or serious audiophile. More kits than you can find anyplace else. All of the finest quality and all designed to perform superbly and give you years of use and enjoyment. And all our kits are easy and fun to build, whether you're a beginner or a seasoned builder. The world famous Heathkit assembly manuals take you step-by-step through assembly and testing, leaving nothing to chance. They even include tips on how to solder. Discover the fun, satisfaction and savings of electronic kitbuilding in the new Heathkit Winter catalog. Remember: "We won't let you fail".

FREE! Send for your copy today.
Heath Company, Dept. 17-26, Benton Harbor, MI 49022

HEATH
Schlumberger

Heath Company, Dept. 17-26
Benton Harbor, MI 49022

Please send the new Heathkit catalog. I am not on your mailing list.

Name_____

Address_____

City_____ State_____ Zip_____

CL-625

Материал, защищенный авторским правом

GET TRUCKIN'. GET A GMC.

You like to get away from it all, right? To do your Truckin' far from interstates and expressways. Where you can exchange the trappings of civilization for trees and sand and water and sky.

Well, we're proposing a very special way to do that sort of thing. The K1500 4-wheel-drive Jimmy . . . a rather magic vehicle from GMC with a talent for taking on terrain that most things with wheels are hard-pressed to handle.

It starts out as a legitimate on/off road truck with an enclosed cargo area for stowing everything from pups to pup tents, kids to kayaks.

Where you take it from there is pretty much up to you.

The standard engine on Jimmy is a 250 CID in-line six. But there are other choices, all the way up to an available 400 CID 4-bbl. V-8.

Boondock Truckin'.

The standard covering for Jimmy's cargo area is a removable fiberglass-reinforced roof section. But you can order an available soft top that quickly folds out of the way.

You can dress up your 4-wheel-drive Jimmy with a number of available wheels. Likewise, tires. Or with any of a number of available 2-tone paint schemes, complete with hood stripes and a stand-up hood ornament.

And if you want to take a little civilization with you when you leave it, you can order available amenities ranging from air conditioning to a stereo AM/FM radio and tape player.

GMC's 4-wheel-drive Jimmy. However you trick it up, it's a fundamentally tough and reliable vehicle. One built by people who've specialized in trucks for 75 years.

Here's what you should do. See a GMC dealer. He knows trucks the way we know trucks. Let him help you outfit a new Jimmy.

And then get Truckin'.

THE TRUCK IN' PEOPLE FROM GENERAL MOTORS GMC

GM

THE PM GARAGE

CAPSULE REPORTS ON NEW AUTO PRODUCTS BY THE EDITORS

Smooth socket universal

Most universal joints for socket sets bind and "wrap up" when crimped at hard angles. Here's one, though, that's as smooth as a straight extension.

Sold by Jawco, this U-joint can bend at a 45° angle, so it easily gets into tight places. It makes pulling those hidden sparkplugs an easy job—one which eliminates the worry of broken porcelain.

The Jawco 45° Flexible Extension Tool, as it's called, comes in square ½ and ⅜-inch-drive sizes, which cost $13.95 and $12.95 respectively. Most tool stores carry it, or you can order directly from Jawco Mfg. Co., 39 Mulberry St., Reading, Pa. 19603.—*M.L.*

Convex fender mirror

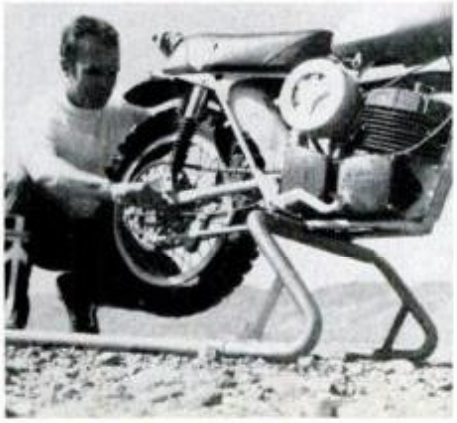
Some people swear by them and others, like myself, have not yet been convinced. The convex-lens fender mirrors that I've seen on so many cars in Europe just don't seem necessary to me. This one, the Broadsight fender mirror, is a handsome and well-made $11 mirror (plus $2 postage) and it even has a snap-back feature that keeps it in alignment even though it may be bunked in parking lots and car washes. It would be a boon to anyone who has the misfortune of being in a neck brace: It saves head-turning before changing lanes. Aesthetically, it's not something I would like on my front fenders (even though I've seen them on some of the world's best-looking cars). Ameropean Corp. 50 Old Hill Rd., Hamden, Conn. 06514. —*B.H.*

Quick distance figures

The Mile-O-Graph is as much fun as it is practical. It's a precision instrument that gives you the exact mileage to your destination. You just follow the proposed route on your road map with the pointer and read the appropriate scale. Presto! No pencils, rulers or calculations. And it's easy to compare different routes so you can pick the shorter if time is a factor in your travel plans. The pen-shaped device, $5.50, has a money-back guarantee of satisfaction. Kimberly's, 10504 Dorothy Ave., Dept. 50Z, South Gate, Calif. 90280.—*B.H.*

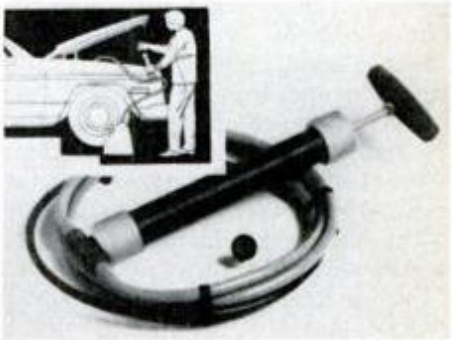
Motorcycle jack

When you get hooked on motorcycling, you're hooked for good, so you might as well invest in the right tools to be able to do your own maintenance. The first thing you need is some way to lift the front and rear ends of your bike so you can spin the wheels. You can use a clumsy stack of 4x4s or cement blocks, but you get a slick lift with this Hart Cycle Jack.



It's tubular steel with a rubber pad to protect frame and pipes. Street bike model is $24 while enduro and off-road jack is $22. Hart Cycle Jack Co., 2774 South Pierce St., Denver, Colo. 80227.—*B.H.*

Utility pump



This hand pump is one of those tools you wonder how you did without. It's got lots of automotive applications (more and more cars have provision for oil changes right through the dipstick tube) and it has many other uses as well. You can empty boat and yard-equipment tanks, and use it for aquariums and dishwashers, too. The Model 500 is made of PVC with aluminum rod and stainless-steel valving and has 8½ feet of tubing. It's $6.95. Thompson Pump Co., 2682 Myrtle Springs, No. 107, Dallas, Tex. 75200.—*B.H.*

Ice-warning gauge

The fascinating feature of this VDO Outside Temperature Gauge is the built-in red light that activates at 37° F. to provide early warning of icing conditions. The electronic gauge mounts in or under your dash and uses a bumper-mount sending unit to pick up ambient temperature. The $49.95 kit is one of many instruments from VDO ('77 catalog is $1). VDO Instruments, 116 Victor, Detroit, Mich., 48203.—*B.H.*

BY ROBERT LUND

DETROIT LISTENING POST

Ford's mystery mini

Ford has started the paperwork for a small car it is expected to put in production in 1980 or '81. This is a tough one to figure and it could be any of several different cars:

■ It could be a brand-new job.

■ It could be a made-in-America Fiesta. Fiesta, the small car coming from Europe, won't be here until summer. The company has said if the market for minis really roars in the next few years, it will consider building Fiesta in this country. So the one in the incubator could be an American Fiesta.

■ Ford is keeping an eye on a smaller-than-Chevette car being developed by General Motors and the new job could be Ford's answer to a smaller mini from GM. More details later.

Sizing up GM's mid-sizers

Mini, subcompact, compact, intermediate, mid-size, family size, full size, big car (by GM's dimensions), big car (as defined by Ford and Chrysler), luxury car, specialty car. If you find all those categories confusing and have trouble sorting out which makes fit under which heading, welcome to the club. Me too. But don't tell because I'm supposed to know the players without a scorecard.

GM is now reworking its intermediates for 1978-79 in two distinct lines—one batch coming in '78, another in '79. More confusion. How do you sort out the '78 intermediates from the '79 intermediates?

My method, for what it's worth: The '78s are the big intermediates. The "bigs" are Chevrolet Monte Carlo and Chevelle, Buick Century, Oldsmobile Cutlass and Pontiac Grand Prix and LeMans. These cars are currently built on two different wheelbases—116 inches for four-doors, 112 inches for two-doors. Starting next year, all "bigs" will have the same wheelbase, 108.1 inches. The "bigs" will be followed a year later, in '79, by the small intermediates. The "smalls" are Chev Nova, Buick Skylark, Olds Omega and Pontiac Ventura. These cars will have a 103.5-inch wheelbase.

Another way to sort them out: The "bigs" will have rear-wheel drive; the "smalls," front drive.

Sorry, no refunds if you are more confused now than you were before.

New wagon from Ford

Ford will downsize its intermediates in two stages over two model years, same as GM. The first stage will come this fall with a new line of wagons. They will be on a wheelbase of 105 inches. A year later, in 1978—the '79 model year—the four-door cars will go to the 105-inch wheelbase and the two-doors will be pulled down to a tight 100 inches.

Wanted: a no-tinker carb

If you want to make your fortune in the car biz, design a carburetor that does not require an idle adjustment. The auto companies have spent billions to reduce pollution from cars, only to see much of their effort go down the drain because people fiddle with the carb.

Engineers are now looking at different versions of a tinkerproof carburetor. They would like to come up with a life-of-the-car unit that could be sealed in at the factory. But that's not very practical. Someone would find a way of violating the seal and there's no such thing as a working part that could be guaranteed to function faultlessly for the life of the car.

A more practical approach would be a carburetor that automatically adjusts itself, so there's no need for an idle screw to tempt tinkerers. That's assuming cars continue to have carburetors.

Plastic doors coming soon

Many worthwhile improvements in automobiles do not originate with the car companies. They come from suppliers. No charge to the car manufacturer for the idea. The payoff for the supplier comes when the carmaker places an order with the supplier to build the item or parts of it. When the improvement is put on a car, the auto company takes the bow and there's seldom any mention of the supplier. Those are the rules of the game and suppliers don't get miffed because they are left out of the credits.

But if a supplier wants to establish his claim before the car company steals the thunder, there's a way of doing it. Some time before the idea shows up on a production car, the supplier calls a press conference and explains his brainchild. The press conference is held anywhere from a few weeks to a year ahead of the time the device appears.

All of which is background to tell you that Owens-Corning Fiberglas held a recent press conference in Detroit to announce it has developed an all-plastic car door and GM, Ford and Chrysler are trying it out.

More info on Olds diesel

The auto companies know a lot more about you than you might give them credit for. Like whether you're married or single, your age (within a year or two), approximate income, education, how many miles you drive a year, your line of work and a hundred other things.

The companies get the information by doing very thorough surveys of car buyers. The information is fed into a computer to produce what Detroit calls "The Buyer Profile." This is secret stuff and one company never gives another a flash of what it has in the folder.

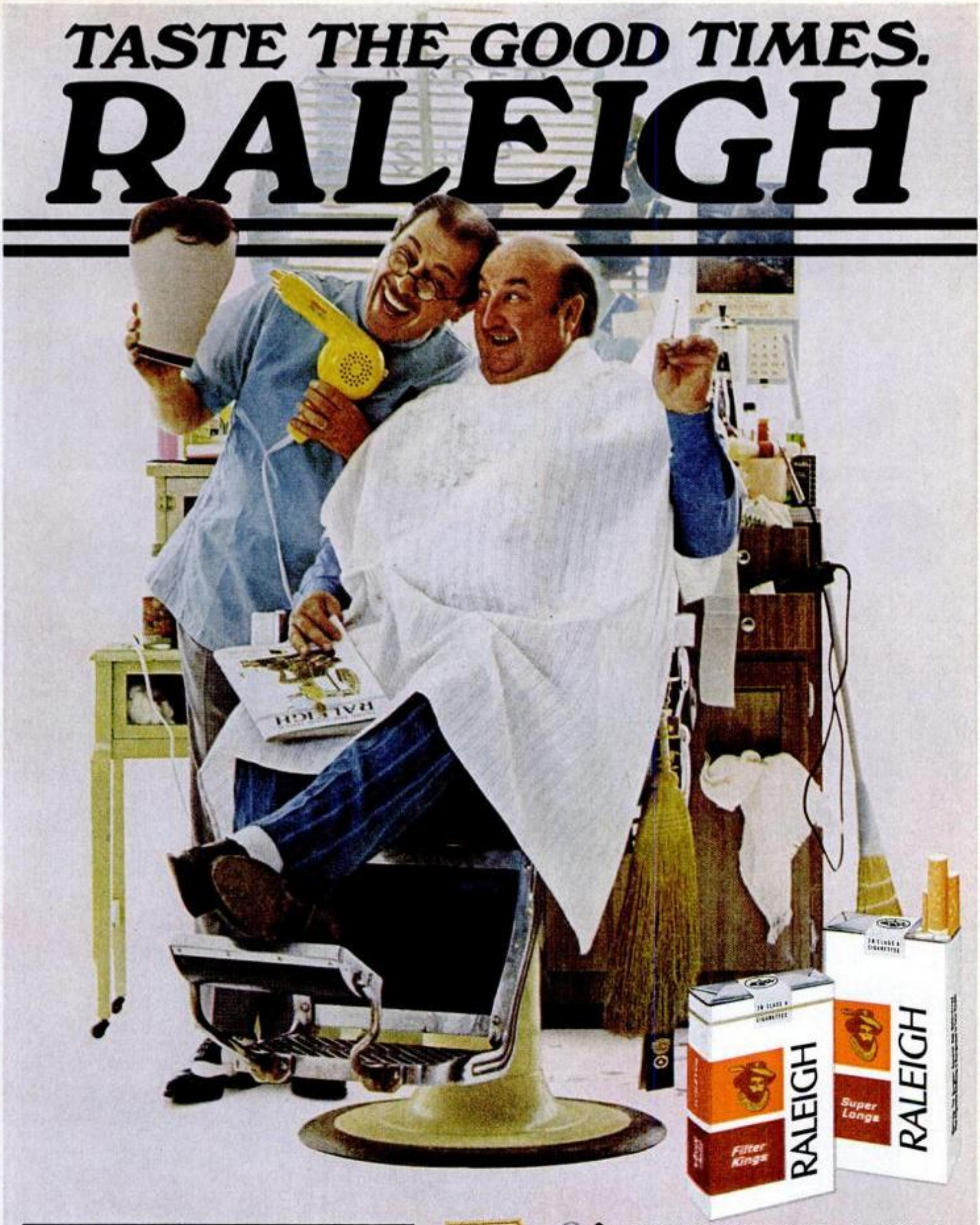
One thing GM did before deciding to put a diesel engine in an Oldsmobile was to do a what-makes-'em-tick of Olds owners. Some of the things GM wanted to find out:

Could the typical Olds customer afford to pay a premium price for a diesel engine? Yes. Is he concerned about gas mileage? Not particularly, but if mileage can be improved he'd welcome it. Does he have a hang-up about being the first guy away from the light or passing other cars on the freeway? (The question has been paraphrased; GM doesn't ask questions that bluntly.) Answer: Speed and the quick getaway aren't a big deal with Olds owners.

You have to do some reading between the lines, but there are tip-offs in the questions on what to expect of the GM diesel. It will carry a premium price tag, give superior gas mileage but not have the usual punch. ★★★

Материал, защищенный авторским правом

TASTE THE GOOD TIMES.
RALEIGH



Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.

Raleigh's good time gifts. Get a Norelco electric shaver with Raleigh coupons, the valuable extra on every pack. See over 1,000 Raleigh gifts, write for your free Gift Catalog: Box 12, Louisville, KY 40201.

You'll remember Raleigh. The genuine tobacco flavor. The valuable gift coupons.

Filter Kings, 16 mg. "tar," 1.1 mg. nicotine; Longs, 17 mg. "tar," 1.2 mg. nicotine, av. per cigarette, FTC Report Apr. '76

© B&W T Co.

Материал, защищенный авторским правом

PM WORKBENCH
PM EXAMINES PRODUCTS AND SERVICES

Air-impact drain cleaning

Stacked up against the cost of a drain cleaning service or a plumber, this tool could be a good investment. The Kyna Colt is charged with a CO_2 cartridge. Use the variety of rubber discs to fit between the nozzle and your backed-up drain. Push the handle down and the one-shot blast of gas sets off a shock wave in the standing water that travels along the pipe to the obstruction.

Basic Services, 509 West 38 St., New York, N.Y. 10018, guarantees 95 percent of all blockages will clear. The $50 tool is also sold through Sears.

Moderate-priced table saw

Rockwell bills its new model as a Homecraft Table Saw. The main table is pretty solid—which is true of the tool's general construction (though the rip-fence adjustments are somewhat under-built). The price ($254.99) and the blade capacity (10 in.) make it a solid buy for medium-duty use.

One drawback: The splitter (that attaches to an extension of the housing) and the blade guard don't line up with the blade. I tried to adjust our sample with no success, and have since seen two saws (one set up by Rockwell employees) that were out of alignment. The people I talked to at the company didn't seem too bothered by this. The message I got was that design changes weren't called for since most people remove the guards anyway.

In fact, there's so much play in the guard that a moderate amount of pressure is enough to drive it into the blade.

A brushless finish

It's a weird feeling to apply a clear, semigloss finish with a rag instead of a brush. UGL's Wipe-On Zar finish eliminates brush cleaning and that inevitable loose brush hair that gets stuck to the surface. A flat-

napped rag works well and makes it quick and easy to cover turned pieces like chair rungs. The objects I coated did dry free of "wipe" marks.

The company claims coverage of up to 400 sq. ft. for a pint, which is hard to judge but seems a bit high from the amount I used in sealing pine shelves.

A foamy house

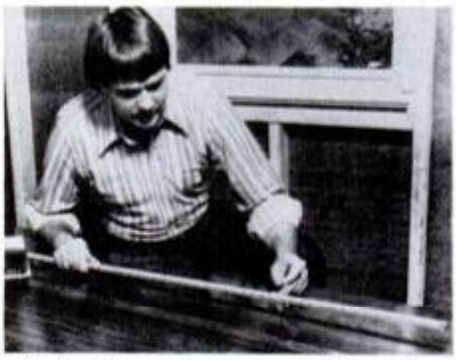
Here's a great idea whose time came too soon. Fomofill is like a can of shaving cream except it's filled with a urethane foam solution. The thin nozzle is ideal for insulating hard-

to-reach places where the foam dries to fill voids in wood, masonry or metal (even in car trunks).

The cans I used worked great the first time and then clogged. The instructions say to clean the nozzle after use with a solvent (what a mess) or pull the dried foam out later with a paper clip (didn't work for me). With a self-cleaning tip, this stuff would be terrific. The 18-oz. cans will sell for $6.95.

Easier to measure

You get real value from a tool that does more than its job. You can measure distance on any ruler, but the new Stanley 8-ft. steel tape (called "The Extender") is rigid enough to support itself up to 7 ft. The "helping hand" at the other end



of the tape is a real plus when you've got both hands full. Suggested list price is $2.99.—*M.M.*

Материал, защищенный авторским правом

"Eveready" Battery Refund Bonanza!

You may get the "Mystery" Refund Certificate worth

$10,000.

You're guaranteed $1.00 refund.

Go to your participating "Eveready" retailer and pick up a "take one" coupon from display. Then, mail the coupon, together with 3 proofs-of-purchase from any "Eveready" battery packages, to the address on the coupon. You'll get back a $1.00 cash refund check in the mail. *Plus*...

A "MYSTERY" REFUND CERTIFICATE.

(Or, mail in the "take one" coupon for a "Mystery" Refund Certificate without purchase or refund.) This Certificate will be redeemed for its cash value of $1.00 to $10,000 when you mail it back with a proof-of-purchase from any "Eveready" battery pack (with plastic removed). See Instructions for details concerning "Mystery" Refund Certificates. Get in on the "Eveready" Battery Refund Bonanza...now! "Mystery" Certificate values: one, $10,000; two, $1,000; five, $500; ten, $100; twenty, $50; two hundred, $10; one thousand, $5; all others, $1.00.

"MYSTERY" REFUND CERTIFICATE INSTRUCTIONS

A. Each "Mystery" Refund Certificate will have a hidden cash value of from $1.00 to $10,000, which can be uncovered and the Certificate redeemed by mailing it and a proof-of-purchase from any one "Eveready" battery pack (package with plastic removed) to the address given on the Certificate. One Certificate will be printed with a $10,000 cash value; two with a $1,000 value each; five with a $500 value each; ten with a $100 value each; 20 with a $50 value each; 200 with a $10 value each; 1,000 with a $5 value each. All others will have a $1.00 value each.

B. All "Mystery Refund Certificates will be mixed, distributed, and dispersed by Marden-Kane, Inc., an independent agency, totally and solely on a random basis throughout the offer and geographic area covered by the offer and among all persons requesting them (with or without refund request).

C. All "Mystery" Refund Certificates may not be distributed or redeemed. The cash value amounts of those undistributed and unredeemed Certificates will never be paid out. Program begins January 1, 1977; redemption period ends January 31, 1978. Certificates mailed (postmarked) for redemption after January 31, 1978 or received after February 15, 1978 will be void. Certificates valued at $50 or over must be sent by registered or certified mail.

D. This offer is open to all residents of the United States EXCEPT employees and their families of Union Carbide, its subsidiaries, affiliates, advertising agencies, Marden-Kane, Inc. and their respective production agents. Void where prohibited.

E. For a list of redeemers of Certificates valued at $50 and above, send a stamped, self-addressed envelope by January 31, 1978 to: Redeemers, P.O. Box 1903, Long Island City, New York 11101. Do not send your Certificates to this address for redemption. List will be sent after close of promotion.

F. Limited to one Certificate per family or organization. Neither Certificate nor its cash value is transferable or assignable. Redeemers of Certificates with a cash value of $50 or more may be asked to execute a certificate of eligibility. Not responsible for Certificates misaddressed or lost in the mails. Allow 4-6 weeks for mailing of check. No purchase necessary to secure a "Mystery" Refund Certificate.

• Void in Missouri and where prohibited by law. • Store displays not available in Wisconsin. • Residents of Wisconsin may get a "Mystery" Refund Certificate without purchase or refund by sending their name and address to: Certificate, P.O. Box 1902, Long Island City, N.Y. 11101.

UNION CARBIDE

Материал, защищенный авторским правом

Learn all the best ways to do-it-yourself and do it right!

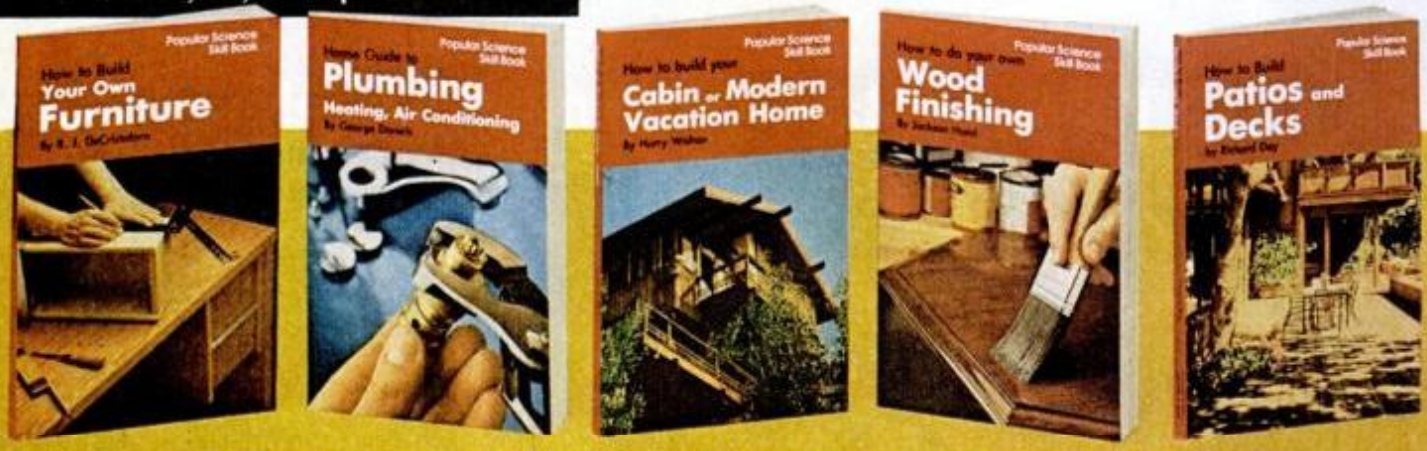
Take these 10 fabulous

Yours now when you join POPULAR SCIENCE BOOK CLUB

The best-selling *Popular Science Skill Book Library* in deluxe hard-gloss paperback editions. A $35.00 value—now yours for just $1.95.
1650 PAGES of step-by-step how-to by top do-it-yourself writers.
NEARLY 3000 SHOW-HOW ILLUSTRATIONS, photos, assembly drawings, building plans, tool diagrams, shop tips and more.

America's favorite do-it-yourself books. Over 2,000,000 copies sold!

A lifetime library of expert do-it-yourself know-how!



Each volume in handy shop size: 6″ x 9″; bound in deluxe hard-gloss paper covers.

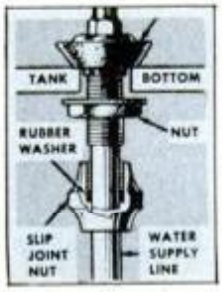
Popular Science

Here's your chance to join the #1 book club for do-it-yourselfers and get a ten-book library of practical know-how for just $1.95. The best-selling *Popular Science Skill Book Library* is a lifetime guide to doing scores of home handyman jobs like an expert. You save time, money and frustration on everything from fixing the plumbing, building and finishing furniture . . . to doing your own masonry work, painting, papering, wiring, shop projects and more. Your guides are expert craftsmen who explain their ideas clearly and simply. You see how to do it in excellent show-how illustrations. *Thousands of them!* In all, you get instant handyman information whenever you need it.

Build A Valuable Homeowner's Library *at giant discounts!*

That's what Popular Science Book Club is all about. Expert how-to for today's do-it-yourselfer. Club membership entitles you to choose many more new books on your favorite handyman subjects. All at giant discounts. You also get first choice of special custom-written books—commissioned specially by the Club—and offered exclusively to the membership at discount. The ten-volume *Popular Science Skill Book Library* is an example. First-rate how-to that can turn any homeowner into a first-rate handyman. **You can get your thirty-five dollar Skill Book Library for just $1.95 . . . when you join Popular Science Book Club now. Send the card today!** *(Offer limited.)*

Remodeling how-to . . .



Plumbing savvy . . .

Shop projects . . .

★ **HOW TO BUILD YOUR OWN FURNITURE** by R. J. DeCristoforo. How to build tables, chairs, cabinets, desks and more with just three basic elements: slabs, rails and legs. Complete information on construction, tools, wood, hardware, fasteners, fixtures. How to adapt standard components in new ways.

★ **HOME GUIDE TO PLUMBING, HEATING, AIR CONDITIONING** by George Daniels. Step-by-step how-to for doing your own maintenance, repairs, installations. All principles, tools, techniques, instructions. Plumbing: fixtures, drainage, septic systems, more. Heating: electric, gas and oil heating, more. Air conditioning: systems, room units, more.

★ **HOW TO BUILD YOUR CABIN OR MODERN VACATION HOME** by Harry Walton. Build your own vacation home for a small fraction of regular cost. You get complete construction methods for foundations, porches, fireplaces, chimney, paneling, siding, more. Sites, plans, materials, utilities, financing.

★ **HOW TO DO YOUR OWN WOOD FINISHING** by Jackson Hand. How to finish new wood, apply fillers, bleaches, stains, paint, shellac, varnish, lacquer, enamel. A complete guide to restoring marred surfaces, antiques. More on novelty finishes including French polishes and glazes. Many pages in full color.

★ **HOW TO BUILD PATIOS AND DECKS** by Richard Day. How to design and build a patio or deck for any-size property. No previous woodworking or masonry experience needed. All the do-it-yourself how-to explains everything about construction materials, building plans, assembly techniques, tools, shortcuts, accessories. How to build footings, piers, posts, beams, tiles, more.

MAIL ATTACHED CARD OR WRITE TO:

Материал, защищенный авторским правом

Sharpen all of your handyman skills and save time, effort and dollars!

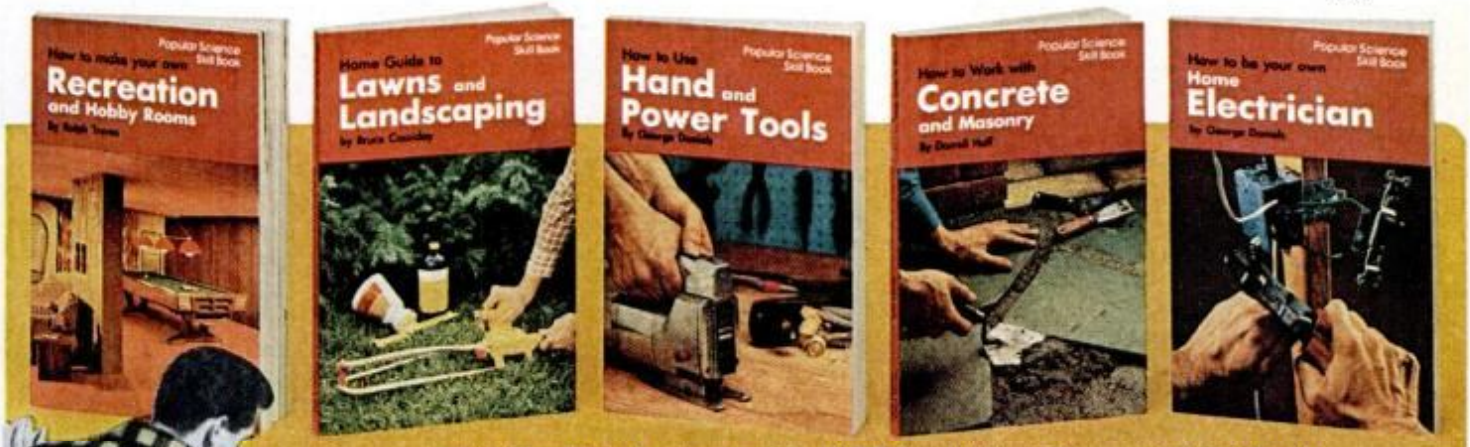
handyman books for just $1.95

and agree to take just two more books within a year.

Regular price: $35.00

Club membership entitles you to choose many more books at Club discounts up to 60% and more. Brand new handyman books on all of your favorite subjects: Home Improvement & Repair. Housebuilding. Wiring. Plumbing. Woodworking. Cars & Car Repair. Workshops. Appliance Repair. Electronics. Science. Technology. Masonry. Carpentry and more.

Guides you through every fix-and-finish-it job you'll ever do!



Each illustrated volume with INDEX to find what you want in a hurry.

Skill Books

★ **HOW TO MAKE YOUR OWN RECREATION AND HOBBY ROOMS** by Ralph Treves. Convert your attic, basement, garage, breezeway into a fun room easily, inexpensively. Complete instruction on carpentry, masonry, insulation, wiring, heating, decorating, more. Floors, walls, windows, doors, dormers, storage ideas, more.

★ **HOME GUIDE TO LAWNS AND LANDSCAPING** by Bruce Cassiday. Professional home landscaping tips and how-to on testing and grading the soil, sowing proper seed and sod, planting over 100 different deciduous and evergreen trees and more than 100 different ornamental shrubs, hedges, border plants. How to use flagstone, pebbles, slate, railroad ties, much more.

★ **HOW TO USE HAND AND POWER TOOLS** by George Daniels. How to choose, use, take care of all tools. Hand tools: hammers, saws, chisels, planes, more. Power tools: sabre saws, drills, routers, sanders, lathes, more. How to set up a power shop, safety practices, money-saving ideas, shortcuts.

★ **HOW TO WORK WITH CONCRETE AND MASONRY** by Darrell Huff. The do-it-yourself answer book on how to mix, pour, reinforce, cure, trowel, texture and color concrete. How to lay bricks, block, stone, flagstones. How to top and waterproof a wall. Step-by-step instructions for building forms for foundations, patios, barbecues. How to use transit-mix and ready-mix concrete. All finishing details.

★ **HOW TO BE YOUR OWN HOME ELECTRICIAN** by George Daniels. All the basics of electrical tools, codes, types of wire, house wiring, service wiring, outlets, plugs, switches, fixtures, doorbells, fuses, electric motors and more. Also, basic electrical theory, safety information, NEC requirements.

How Your Club Works

- First, you get your ten-book Popular Science Skill Book Library (regular price $35.00) for only $1.95 plus postage and handling. Send no money now. We'll bill you after you receive the books.
- Then, about every four weeks (15 times a year), you'll receive a bulletin describing the current selection and alternate books available. All at big discounts.
- If you want the selection only, do nothing. It will be sent to you automatically. If you don't want the selection or want alternate books, or no books, just indicate your wishes on the form that comes with the bulletin and return it by the date indicated.
- You need never buy a book if you don't want it. Your only obligation is to buy two additional books within a year. You may cancel membership any time after that.
- **GIANT DISCOUNTS!** You save up to 60% on every book offered in the Club. Yet virtually every book is identical to the publisher's edition. Same paper, printing, binding, jacket. Same everything except price. What a great way to build a valuable handyman's library at the biggest book bargains available anywhere.

Tool tips...

Building details...

Finishing schedules...

POPULAR SCIENCE BOOK CLUB P.O. Box 2006, Latham, N.Y. 12111

Материал, защищенный авторским правом

ALL OUTDOORS

Recreation award

The U.S. Department of the Interior's highest outdoor recreation honor recently went to The Stanley Works, famous New Britain, Conn., tool and hardware maker. The Outdoor Recreation Achievement Award was given in recognition of the donation by Stanley of 160 acres of scenic and environmentally important land to the Nature Conservancy and the State of Connecticut.

Land parcels include area along the Housatonic River which will expand the grounds of the Sloane Museum of early American tools in Kent, a section of the Appalachian Trail, and an enlargement of the Kent Falls State Park.

Take a peak

A new division of Coleman camping equipment has been created to develop innovative lightweight gear. Called Peak 1, the group will specialize in the production of lightweight backpacking gear and shortly will be marketing packs, day sacks, tents, sleeping bags, and a small backpack stove.

The designs are planned for hikers rather than family campers, and the most unusual items we have inspected so far are the stove and the pack frame. The stove checks in a little heavier than some pack models available, but more than makes up the difference in heat output for fuel carried. The pack frame, of polypropylene, has been engineered with a flexibility that appears to offer the advantages of both rigid frames and conforming movement of internally framed packs, with adjustments to fit exact body shape.

BB bulletins

Firing a Crosman single-shot bolt-action air rifle, Tom Thompson of the University of Illinois recently won top honors in the National Explorer Scout competition at Wichita, Kans. Over 150,000 youngsters took part in shoot-offs.

The best of 700,000 boys and girls from 3500 Jaycees chapters will have a chance to compete in the Olympic-style finals of the 12th annual Daisy/Jaycees International BB Gun Championships this year. The matches will be held at Augustana College, Sioux Falls, S. D., July 1-3.

Offshore alphabet

In the wet world of outboard racing, OZ is not the land of the Wizard and the Tin Man, and the Mod 50 isn't an oversize rock band. But to the uninitiated, boat racing is often a scramble of abbreviations and acronyms, so we asked Ron Pedderson, Johnson Outboards resident savant, for an up-to-date translation.

Long-shot archery record with handheld bow was recently set at 1077 yards at Bonneville Salt Flats by Bruce Odle with Browning recurve bow and special short arrow. Hunting-arrow records neared 500.

The type of event, he points out, where Johnson, Evinrude and Mercury parade their wares, is called Outboard Performance Craft (O.P.C.) racing. The worldwide sanctioning group for O.P.C. racing (in fact, for all forms of powerboat racing) is the Union of International Motorboating (U.I.M.), headquartered in Belgium. The American Power Boat Assn. (A.P.B.A.), in Detroit represents U.I.M. in the United States.

There are three U.I.M./A.P.B.A. Outboard Performance Craft classes in which the motor builders enter their factory-backed finest. All use the tunnel-hull type of race boat. Class OZ (which the A.P.B.A. calls Mod U) is the unlimited class—the fastest, most powerful class of outboard race boats in the world. It's the "run what you brung" division where just about anything in the way of outboard motors and fuel goes. All three companies are currently competing with their hottest V6s here: Johnson's RS (for Racing Special); Evinrude's CC; and Mercury's strongest Black Max.

Next step down is Class ON (Mod 120) with allowable engine displacement of no more than 2000 cubic centimeters. This, too, is a province of the V6s. Johnson and Evinrude run their two-liter competition V6s. Mercury counters with its T-3 and 1750XS.

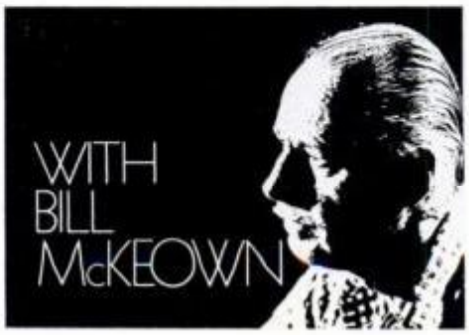
The third "factory" outboard class, and one that has become newly popular in the past year, is OE (Mod 50). The motors here are limited to 850 cc or less. All three factory entries in this class are highly modified racing versions of production three-cylinder models. Johnson runs its Stinger RS here, Evinrude its CC. Mercury competes with its 650X.

A fourth class in this group, and one the factories usually leave to the "amateurs," is OI (Mod 90) with a 1500-cc maximum. Here Johnson and Evinrude fans run older racing versions of their V4 outboards and have also been known to "step up" (run a smaller motor in a higher class) with their OE rigs. The 1000 BP is Merc's top OI competitor.

Still confused? Well EP, GP, JP, and FS are other classes that enjoy popularity. Or how about SD, SE, SG and SJ, or SST, UJ and SV? There's room for any driver who likes to win—just join the A.P.-B.A. and find out for yourself.

Sport style

Who says we don't set styles outdoors? Take a look at the popular down-filled jackets and hiking-boot shoe styles. Recent convert, a designer of expensive luggage, offers a backpack with his initials printed all over it for $275. ★★★



Материал, защищенный авторским правом

INTRODUCING SEAFARER.

THE YACHT FOR THE THIRD OF THE WORLD THAT ISN'T COVERED BY WATER.

Here's something you don't see every other day. A yacht that can cruise down Route 66. It's The Seafarer, the newest innovation from Itasca.

Step inside and you'll swear you're at sea. There's a ship's bell, a ship's clock, a nautical weather station, teak entry and refrigerator handles, a ship's wheel mirror, nautical wall paper, a Davey Jones locker for your wet goods, a fishing rod holder and a reversible galley/game table for those long nights at sea.

And that's in addition to standard luxuries like air conditioning, stereo tape and a power generator.

Deep down inside, though, it's really an Itasca motor home. It has a Chevrolet chassis, engine and drivetrain. It's built by the experienced people who build Winnebagos. And it has over 150 nationwide Itasca dealers to back it up.

Best of all, it comes with Itasca's 3-year/36,000-mile Owner Protection Plan. And that covers anything operational, inside or out, except normal replacement items. So if you keep your 1977 Itasca serviced regularly, for three years or 36,000 miles, no repair job resulting from a mechanical malfunction will ever cost you more than $25. And for the first year or 12,000 miles — Itasca's Limited Warranty period — it won't even cost you a penny.

The Queen Mary doesn't come with an owner protection plan like that. And it can't take you to a mountain stream high in The Rockies. So you'd probably be better off buying a Seafarer.

Bon voyage.

Itasca HOME OF THE 3-YEAR/36,000-MILE OWNER PROTECTION PLAN.

A Division of Winnebago Industries, Inc.

Материал, защищенный авторским правом

Kings, 17 mg. "tar," 1.3 mg. nicotine; Longs, 17 mg. "tar," 1.2 mg. nicotine, av. per cigarette, FTC Report Apr. '76

©B&W T.CO.
Материал, защищенный авторским правом

CAR CLINIC

BY MORT SCHULTZ

Legal beagle

I have a 1976 AMC Sportabout wagon that is not *equipped with catalytic converter. I want to use regular leaded gasoline rather than unleaded, because it's about 5 cents a gallon cheaper. My dealer says that an intricate recalibration of the engine is needed. Say it isn't so.—Bruce H. Phillips, Houston.*

It isn't so, Bruce, but I doubt that you'll find a service station which will sell you leaded gasoline. Service station operators generally believe it is against federal law to fill cars with leaded fuel if they have restricted filler necks.

However, the law says that it is in violation to fill with leaded fuel only those cars equipped with catalytic converter. If a service station operator is "caught" putting leaded fuel in your car he would *not* be subject to a $10,000 fine as he would if he were caught filling a car having catalytic converter with leaded fuel.

You can, then, take a funnel or some other kind of adapter with you to your service station and fill the tank of your Sportabout with leaded gasoline if the attendant lets you.

The warning decal and restricted filler neck is on your car because the emissions certification for your engine is based on the long maintenance intervals which have resulted from using unleaded fuel. For example, you need not replace sparkplugs for 30,000 miles nor is EGR maintenance called for until 30,000 miles. Once the engine is certified under these conditions, the company contends that it would be against the law for it to set the car up to permit the use of leaded fuel.

To sum up as far as you are concerned, Bruce, here are the facts:

- You can use leaded fuel in your car, and a service station operator who agrees to sell you leaded fuel would not be violating the law.
- To conveniently fill your car with leaded fuel would require that you replace the entire fuel tank to eliminate the restriction in the filter neck. If you don't want to do this, you would have to use a funnel or some other adapter to get the fuel pumped into your car.
- Once you switch to leaded fuel, you lose the benefit of long maintenance intervals that unleaded fuel provides. You may have to replace sparkplugs every 15,000 miles or do an EGR service every 5000 miles.

Rabbit with a 'harey' problem

What must be done to cure a hesitation-during-acceleration problem with a 1975 VW Rabbit? The engine has had a complete tune-up, and a new catalytic converter has been installed. My dealer doesn't seem to know where to look for help.—Maurice Kelhoffer, Livingston, N.J.

He just needs a little guidance—right to his service bulletin file. There, he should dig out bulletin P22C, which gives the procedures necessary for ridding Rabbits of this "harey" problem. The remedy is intricate, involving complete carburetor disassembly, new settings and drilling out the choke housing.

Taillight tale

Hey, Mort, that item in the August Car Clinic, "Fussin' over fusin'," really hit home. Let me tell you my experience with the same problem. I'm a GM service manager here in Pocahontas, Iowa. The owner of a 1974 Vega came to us with a taillight outage problem. Finding no obvious reason, I replaced the fuse and sent the car on its way.

Three days later I get a phone call from the party. Same problem. I must admit I was baffled, especially after making another thorough check. Why does the taillight fuse blow when nothing else is activated? I had to find out, so I drove the car. Having the parking lights on had no effect. Neither did driving with the headlights on. Then it happened. I parked the car and set the parking brake. *Bingo went the fuse.*

I lifted the boot around the brake, and there lay my problem—bare wires. The harness feeding the taillights passes through this spot. I taped up the wires and haven't seen that Vega since.—Mike Doffert

Ah, Mike, you relate a good and valuable tale. Thanks.

Vocal Volare

The front disc brakes of my 1976 Volare Premier squeal every time they are applied. The car has been in and out of the Plymouth shop five times. They try, but they can't cure the problem. Brake silencer pads work temporarily. Now Chrysler's top man in Memphis informs

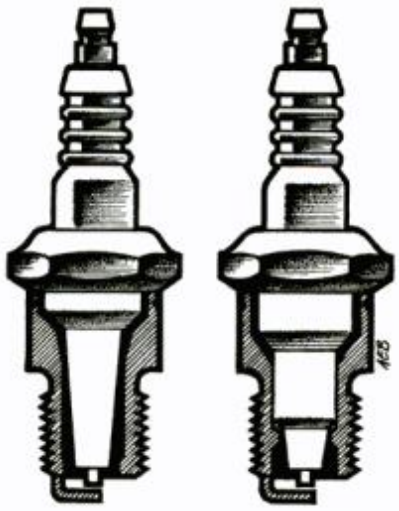
(Please turn to page 56)

PM CAR CARE tip

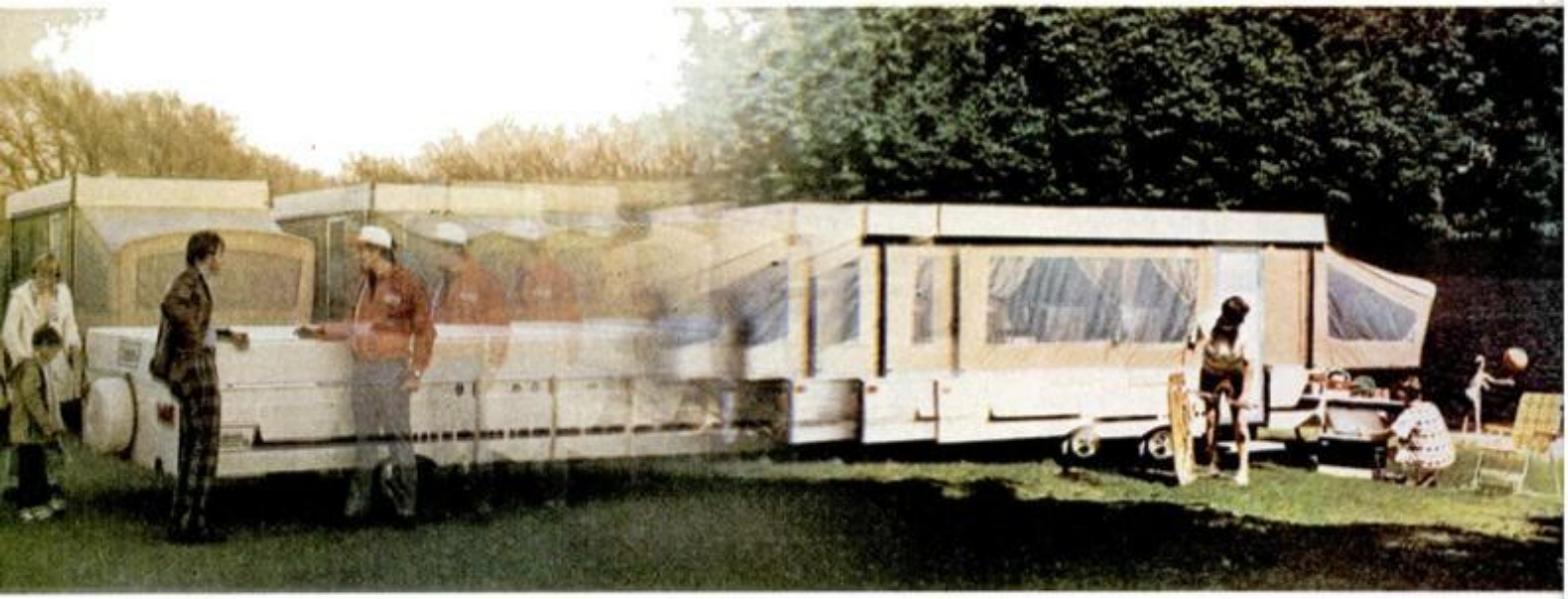
Plugging along

Automotive terms can get confusing. "Hot" and "cold" are examples when they are applied to sparkplugs. A "hot" sparkplug is one that transfers heat slowly, which allows the plug to operate at a higher temperature. It has a *low* heat range because its larger insulator base area absorbs much heat (illustration). Conversely, a "cold" sparkplug, because of its smaller insulator base area that can absorb little heat (illustration), has a faster rate of heat transfer and is able to operate at a cooler temperature. A "cold" plug has a *high* heat range.

You can get several plugs for your engine ranging from "coldest" to "hottest." The one you select depends mainly on driving conditions. Plugs must be hot enough to stay clean and cold enough to prevent premature ignition (preignition), which could cause sparkplug and engine damage.



HOT PLUG COLD PLUG



Buy your Coleman Camper now...we'll make your payments 'til spring.

Buy any Coleman 1977 camping trailer between January 1 and March 31, 1977, and we'll make all your payments 'til spring! That means you can save up to $150—and the earlier you buy, the more payments we'll make for you.

See your Coleman Camping Trailer dealer's seven new 1977 models. They range from a compact trailer for small-car towing clear up to larger luxury models. Each is designed to give your family the fun, carefree feeling of the great outdoors—while you still enjoy complete at-home comfort!

Choose the Coleman camping trailer that best fits your family and your budget. Buy it now. And we'll make your payments 'til spring!

Buy this Coleman Camping Trailer	We'll pay up to this much!
Brandywine	$150
Lexington	150
Yorktown	150
Saratoga	140
Valley Forge	130
Concord	130
Gettysburg	100

Coleman Camping Trailers
the camper's camper
The Coleman Company, Inc.
Camping Trailer Division
Somerset, PA. 15501

Limited-time offer. Based on standard 36-month financing with 10% down payment and 12.5% interest rates. Offer good in Continental U.S.A. only.

Write for free full-color literature!

CAR CLINIC

(Continued from page 55)

me that all disc brakes squeal. Please help. The brakes are louder than the radio.—Randy L. Carswell, Hixson, Tenn.

All disc brakes don't squeal. Plymouth Volare and Dodge Aspen disc brakes do squeal. The reason is hard and, consequently, long-lasting brake linings.

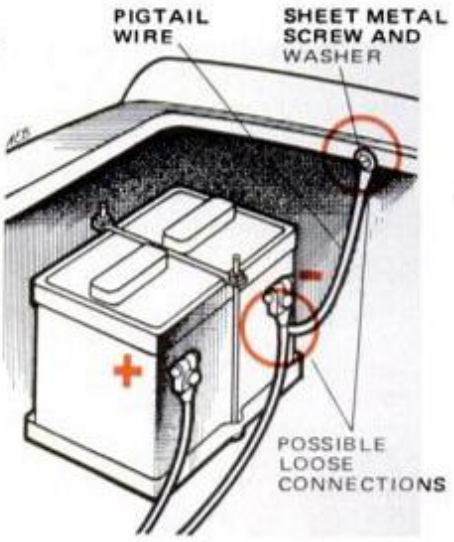
There are two things you can do. You can spray these linings with brake-lining silencing compound. Kent Industries makes a known-to-work product. However, this solution is temporary.

For a permanent cure, switch to riveted brake linings, which are softer. However, lining for lining, the soft ones give less life than the bonded linings now in your car.

PM CAR CARE tip

Here piggy, piggy

Many of today's cars employ a "pigtail" wire which serves as the battery ground between negative post of the battery and the body sheet metal. The ground path for electrical items, such as headlights, horn, and heater blower motor, is from the battery negative post to the body sheet metal through the pigtail. It's not uncommon for a poor ground to exist because of a loose or dirty connection at the spots shown in the illustration. The result may be dimmed headlights and on-again, off-again accessory performance. You can check for a bad ground with a voltmeter or ammeter. With engine off, but headlights on, check for voltage or current draw between alternator bracket and fender. A reading other than zero indicates a poor ground. Check that pigtail.



Oh gee, fellas

My mechanic holds you in high esteem, so please don't let us down. We can't figure out what's wrong with my 1974 Ford Pinto which has the 2300-cc engine and four-speed manual transmission. After driving on the highway about 50 miles, the engine begins missing. It gets so violent at times that I must take the transmission out of gear and race the engine until the missing ceases. When the engine starts this nonsense, I can stop and the engine will idle flawlessly.

We've done tune-ups and cleaned the carburetor. After a tune-up, the engine acts fine for two trips between Tulsa and Oklahoma City. Then, I'm back where I started from. Can you help?—George A. Cheek, Tulsa, Okla.

Oil-fouling of sparkplugs, George—I won't bet my life on it, but I will wager a centavo or two. I say fouled plugs because of two things you said. First, that racing the en-

(Please turn to page 59)

Материал, защищенный авторским правом

NIGHT PATROL, SUNDA STRAITS.

Radar sweeps the horizon. Sonar pulses beneath the surface.

On the bridge, lookouts use moonlight to search their sectors—Java to port, Sumatra to starboard, Krakatau dead ahead.

A job in the Navy doesn't always let you knock off at five o'clock. But on a night as beautiful as this, you don't really care.

It's not just a job, it's an adventure.

The Navy has training in over 60 career fields. If you qualify, we can send you to school in anything from aviation to electronics, from advanced optics to heavy equipment operation. You'll travel, make new friends, get thirty days' vacation with pay.

Navy recruiters have the full story. Speak to one of them or call **800-841-8000** toll free. (In Georgia, 800-342-5855.) The Navy. If you're looking for adventure, you've come to the right place.

Capt. H. C. Atwood, Jr., U. S. Navy B135
NAVY OPPORTUNITY INFORMATION CENTER
P.O. Box 2000, Pelham Manor, N.Y. 10803

☐ Send me more information on Navy opportunities. (G)
☐ Call me. (G)

NAME _____
First (Please Print) Last

ADDRESS _____

CITY _____ STATE _____ ZIP _____

BIRTH DATE _____
Last Grade Completed

PHONE _____
(Area Code)

PM 2/7

NAVY. IT'S NOT JUST A JOB, IT'S AN ADVENTURE.

Материал, защищенный авторским правом

Tires of tomorrow...today!

Bob Wilson is not an average 'Do-It-Yourself' type. He is Chief Engineer on Moon Ship III. But, Bob still tunes his Neptune V20 Sport Coupe in his home computer workshop and he uses YOKOHAMA STEEL-BELTED RADIAL PASSENGER TIRES, exclusively.

In the future when Moon travel becomes routine and when there are Bob Wilsons, we're sure they will have the technical knowledge and engineering expertise to select YOKOHAMA STEEL-BELTED RADIAL TIRES because YOKOHAMAS are rugged radially constructed tires with Tough Steel Cord Belts. Quality tires with strong carcass, heavy bead and shoulder, built by precision computer compounding for longer wear. Strong tires with great road stability, excellent cornering and quick stopping power.

So, in the Future or Today, if you're looking for a tire backed by over 60 years of engineering excellence and manufacturing experience...tires that will give you mile after mile of reliable service...look to the STRONG ONES.

Yokohama Steel-Belted Radial Passenger Tires.

Yokohama Tire Corporation

1530 Church Road, Montebello, CA 90640 (213) 723-9691
A subsidiary of Yokohama Rubber Co., Ltd., Tokyo. Offices Worldwide.

Материал, защищенный авторским правом

(Continued from page 56)

gine alleviates the miss. Racing the engine makes plugs operate hotter, which burns off oil. And second, that after a tune-up the problem ceases for a while. What do you install at a tune-up? Right! New sparkplugs.

But why are sparkplugs fouling? You indicate that you're a salesman. Your car probably has a fair amount of mileage, and I'd guess that valve stem seals may be leaking. You can try a hotter set of sparkplugs. Or you can replace the seals.

Trauma in Wautoma

The service department can't correct a fuel injection problem with my 1974 Volkswagen 412 wagon. The engine has to be cranked a lot before it starts. Then it keeps coughing and missing until it warms up. I've had the car back to the VW dealer many times, so I'll consider this car a lemon unless you tell me otherwise.—V. Tetzlaff, Wautoma, Wis.

Otherwise. Maybe the airflow meter or injectors are a bit on the sour side, but not the car. The airflow meter and injectors are parts of the fuel-injection system that have an effect on cold starting. If the problem turns out to be caused by one of these and not some nonfuel condition, you're okay.

The airflow meter and injectors are guaranteed for five years or 50,000 miles.

A last resort

I'm writing to you as a last resort. My husband thinks that even you won't be able to solve our problem. Please prove him wrong. Our car, a 1972 Pinto, has a tinted windshield. We didn't buy the car new. There's some type of wax ground into the windshield, that defies removal. We have tried—to no avail—gasoline, antifreeze, ammonia, window cleaner, alcohol, vinegar, plastic window cleaner and plain water. Is there anything else you can think of short of breaking the windshield? —Mrs. Harry Hagberg, Centereach, N.Y.

Try jeweler's rouge or a piece of pumice. Rub it over the spot lightly at first, then with heavier pressure if the easy-handed treatment doesn't work. If jeweler's rouge or pumice doesn't help, forget it.

You can get jeweler's rouge and pumice at most hardware stores, but if you should have any trouble, you can also try a local jeweler for the rouge, and drugstores normally sell pumice.

SERVICE TIPS

■ Be one up on your Chrysler, Dodge or Plymouth dealer with this tip: If your 1977 model with 400 or 440-cu.-in. engine is misfiring or backfiring, tell him to install a new reluctor (part No. 4091277). This part changes rotor alignment 5°, which minimizes the crossfiring that causes poor engine performance. Once the dealer makes the change, he must retime the ignition to the specification provided on the vehicle's emission control information decal.

■ Here's a simple tip that may cure a cold-engine hesitation or stalling problem with some 1976 Fords and Mercurys having a 351-cu.-in. engine: Relocate the accelerator-pump actuating rod to the top hole (No. 4 position) on the throttle-actuated bellcrank. This increases accelerator-pump action, providing greater fuel displacement. ★★★

GOT A PROBLEM WITH YOUR CAR?

Just ask Mort about it. Send your question to the Car Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. While letters cannot be answered individually, problems that are of general interest will be published in the column.

Deciding which smoke alarm to buy could be one of your most important decisions. Here's why more families are choosing the Home Sentry® Smoke Alarm from GE than any other.

The Home Sentry Smoke Alarm from GE is an early-warning system that "sniffs" the air for the presence of smoke and sounds an alarm when smoke reaches it. Here are some of the reasons more families depend on the Home Sentry Smoke Alarm than any other smoke alarm.

The battery-operated Home Sentry Smoke Alarm is the *only* smoke alarm with a 3-point checking system to assure you the alarm and the entire system are in working order. It features a 12.6-volt Duracell® battery made especially for smoke alarms by P. R. Mallory & Co. Inc. And because it's battery-operated, the

Home Sentry Smoke Alarm can continue to function even if household power fails.

Of course, there's no way to guarantee against injury or loss of life in a fire; however, the Home Sentry Smoke Alarm from GE is intended to help reduce the risk of tragedy. And every Home Sentry Smoke Alarm is backed by the General Electric name and the quality and reliability it stands for.

The Home Sentry Smoke Alarm is compact and easy to install with common household tools. For more details and a demonstration, see your local GE dealer. Now's the time to buy one—or as many as your home may need. The Home Sentry Smoke Alarm could help you save your home and your family's lives.

GENERAL ELECTRIC

Benchtop vise for tricky holds

A pair of pipe clamps and scrap material make this super holder.

by Richard M. Gutter

My benchtop vise was originally made to hold picture-frame molding for routing. It proved ideal for holding the thin strips of molding, since it supports them securely along their entire length at a convenient height. It also serves as a sort of production fixture for turning out a number of identical pieces quickly and easily.

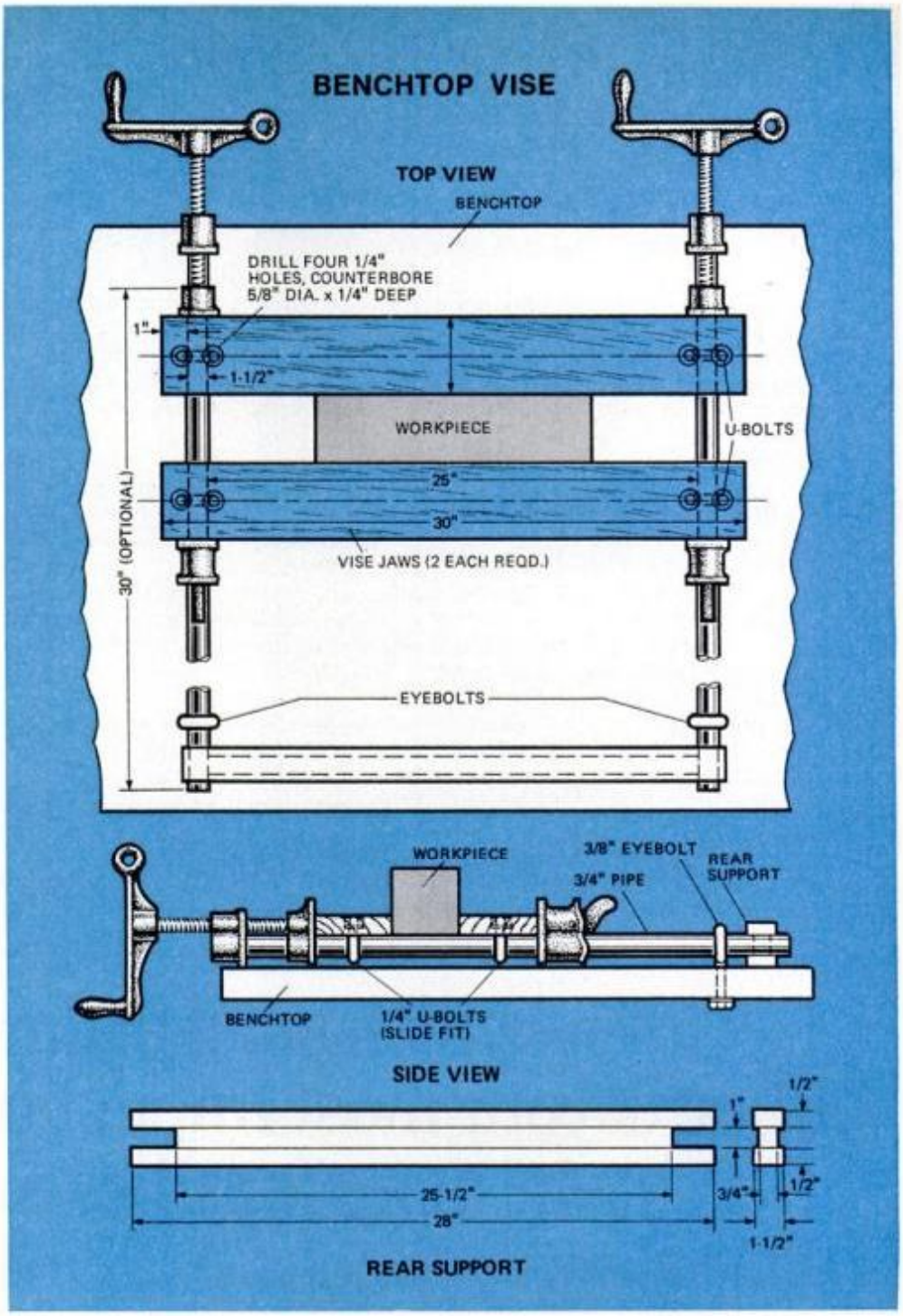
A pair of pipe clamps (perhaps you already have them hanging in a corner of your workshop), several U-bolts, a pair of eyebolts and a couple of boards are all it takes to make the vise. It can do a job equal to many on the market which cost considerably more.

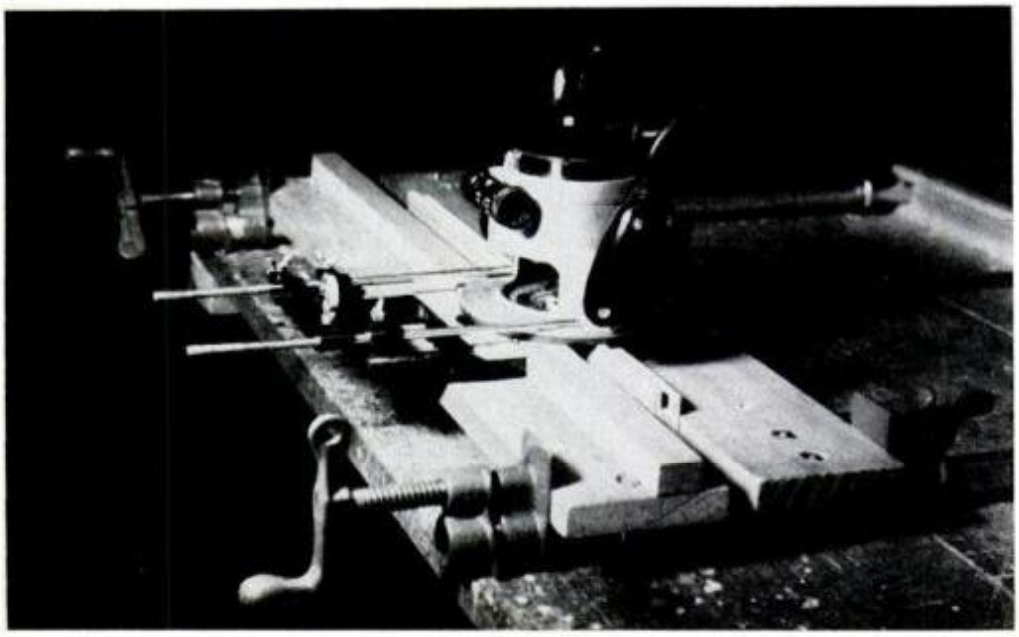
If you buy the pipe clamps and the needed hardware, the vise will cost about $20. If you already have the clamps, about $5 worth of hardware will put you in business.

Assembling the vise

Assembly of the vise (as shown in the drawing) is very straightforward. The jaw boards slide along the pipes which serve as rails. The

(Please turn to page 62)





The continuous clamp system is a low-cost way to turn the top of your bench into a versatile work surface that can hold a variety of shapes and sizes securely. The picture frame molding in the vise at left is ready to be routed. The vise is ideal for holding the molding strips because it supports them securely along their entire length. Two smaller pieces of molding can be gripped in the vise and routed together. It holds material at a convenient height to be routed, sawed, sanded or worked on in other ways.

Материал, защищенный авторским правом

Announcing the perfection of a breed... the all-new Chrysler 300

Chrysler proudly announces the first all-Chrysler stern drive ever made: the new "Chrysler 300"!

The "300" is engineered to give you more of what you demand from a truly great stern drive. Ease of handling. Maximum performance. To accomplish this, it took the expertise of Chrysler's finest engineers.

Patented Steering System

The "300" introduces a husky "inverted yoke" steering/suspension system that provides amazingly easy steering performance at all speeds.

Patented Self-Energizing Clutch

Incredibly compact and lightweight, the "300's" patented self-energizing clutch makes all shifting surprisingly smooth with no noisy jolts when it is engaged.

And that's not all. The "300" lower unit was thoroughly tested in one of the world's few computer-controlled water test tunnels. The unit dramatically cuts water turbulence and cavitation at high speeds.

Plus, the "300's" big capacity, advance-design exhaust located above the cavitation plate increases top speed. Gives more than adequate reverse thrust. Makes steering easy on quick take-offs.

The "300" is precision-mated with five proved-dependable Chrysler quality powerplants: the 265, 240 or 195 hp. gas and the 130 or 105 hp. diesel. It accommodates most standard stern drive controls and can replace most competitive stern drives with a simple reshaping of transom cut-out.

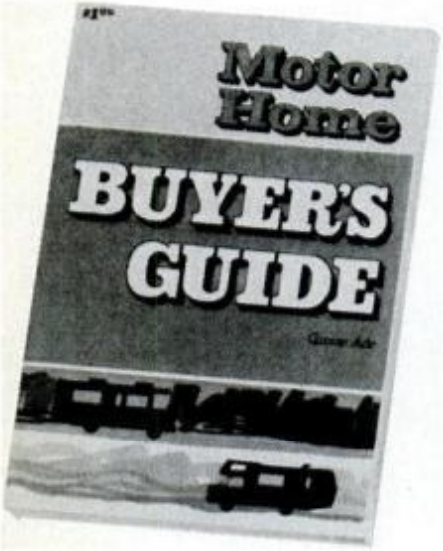
The "Chrysler 300" Stern Drive. One more reason why Chrysler keeps on earning its reputation as the pacesetter in modern marine power.

For more information contact: Marine Division, Chrysler Corporation, P.O. Box 1, Marysville, MI 48040.

MARINE DIVISION CHRYSLER CORPORATION

A lifetime of engineering. For the time of your life.

Before you spend $8,000 or more for a motor home, spend $1.95 for this.



When you buy a motor home today, there are a lot of choices. And a lot of ways to go wrong. The *Motor Home Buyers Guide* can help you get the best motor home for your money. It tells you what to look for, what questions to ask before you buy. More than 100 pages, packed with facts about costs, models, floor plans, features and construction.

This guide is published by Winnebago. It's authoritative. And honest. We honestly believe the more you know about motor homes, the better you'll like ours. Send $1.95 now. It could save you a lot of grief. And money.

Winnebago Industries, Inc.
Consumer Information Dept. O2C20
1909 East Cornell, Peoria, Ill. 61614

Enclosed is my check or money order for $1.95. Please send my Motor Home Buyers Guide to the address below.

NAME_____

ADDRESS_____

CITY_____

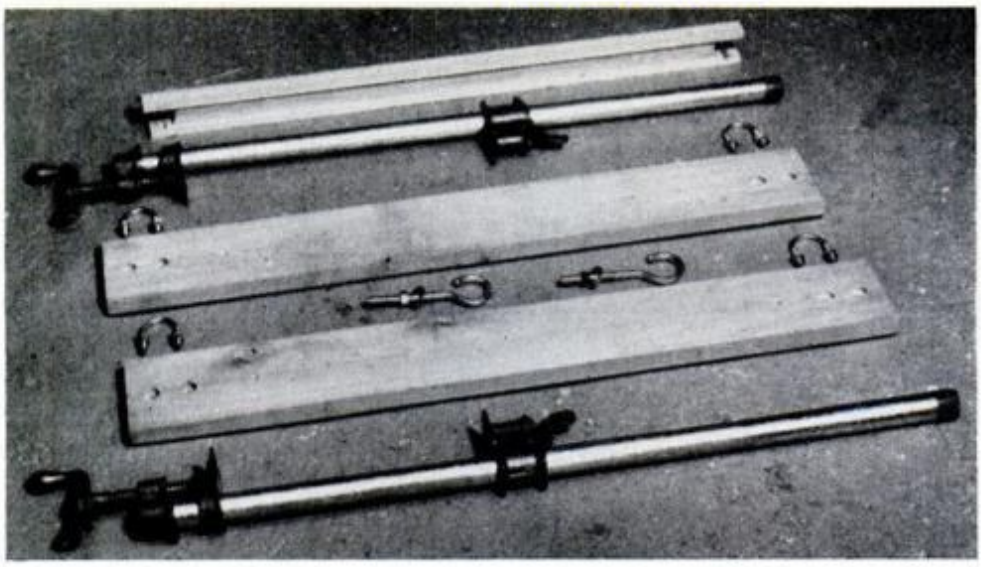
STATE_____ ZIP_____

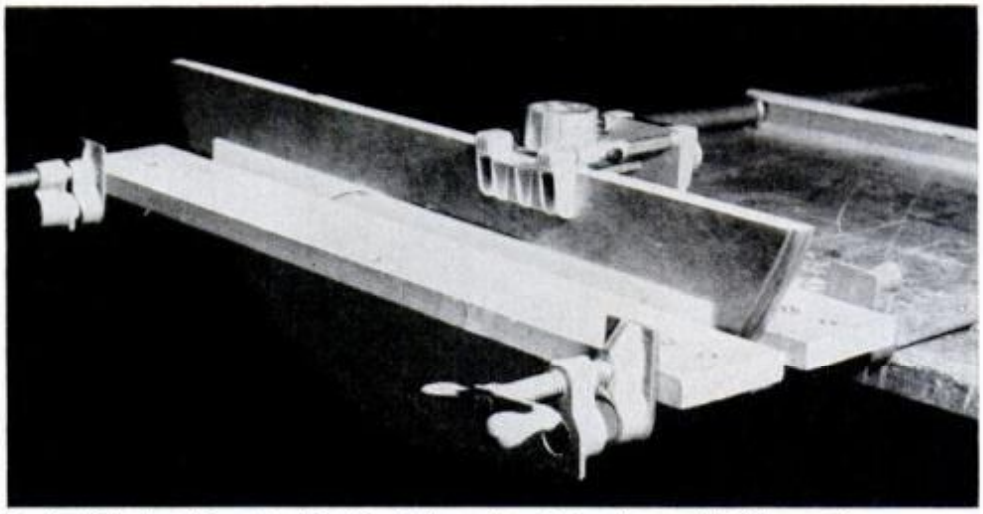
WINNEBAGO®

The name that means the most in motor homes.

BENCHTOP VISE FOR TRICKY HOLDS

(Continued from page 60)





Parts of the benchtop vise (top) include a pair of pipe clamps, U-bolts, a pair of eyebolts and some 4-in.-wide hardwood. The eyebolts are opened slightly to clear the pipe. Total cost of the material, including the pipe clamps, is about $20. The assembled vise (above) is set up for doweling a tabletop section. With corner blocks nailed to the boards at 45° angles for protection, the vise holds the table halves together after they are glued. Four-foot-long pipes are used in the vise for this job.

U-bolts (specifically designed for the ¾-in. pipe) are not completely tightened and the pipes are paste-waxed for smooth operation.

I chose 30-in. lengths of threaded pipe for my vise. The jaws are made from 4-in.-wide hardwood that was on hand. The board dimensions and the pipe lengths are not at all critical. The choice of lengths is largely a matter of convenience for your particular work space. Two ⅜-in.-dia. holes must be drilled in the benchtop for eyebolts to mount the device.

Tricky vise holds

I realized the versatility of this fixture for the first time when I needed to repair the split round top of an old table. The top was over 30 in. in diameter and, because of its shape, difficult to hold for doweling and gluing. I used 4-ft.-long pipes in my benchtop vise for this job. It was not only easy with the vise to hold each half of the tabletop for drilling dowel holes, but by nailing pieces of scrap lumber to the jaw boards at 45° angles, the tablestop halves were readily drawn together and securely clamped until the glue dried.

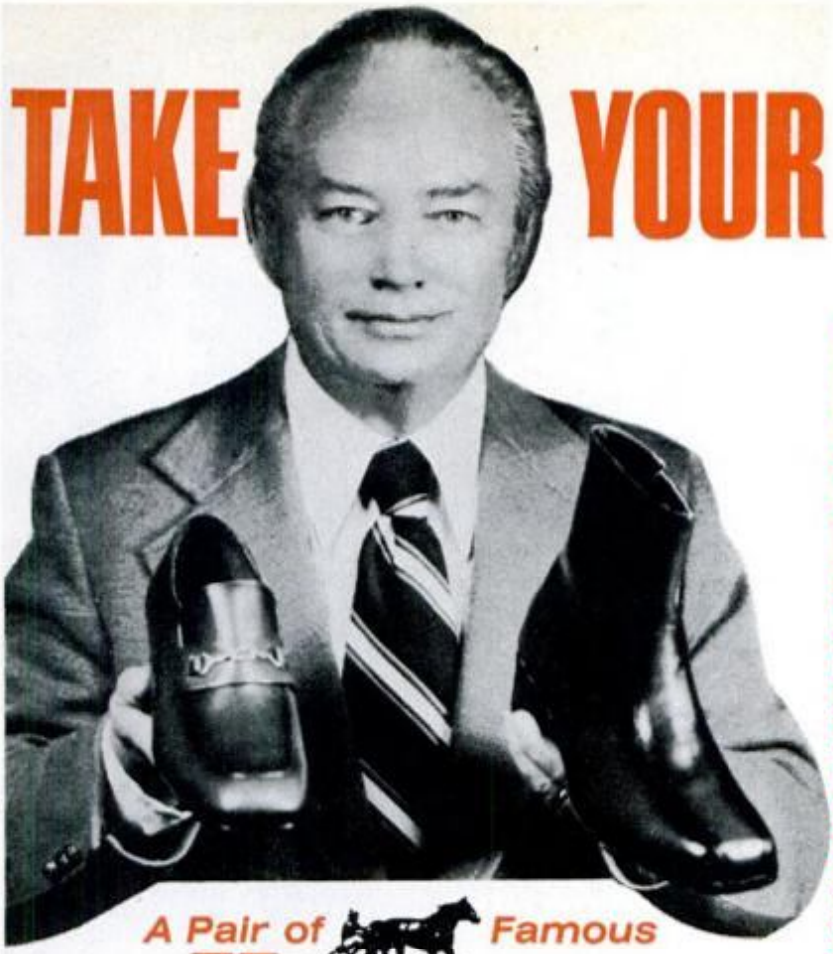
The vise has proved equally useful in other jobs. It holds workpieces of many sizes and irregular shapes, including tapered pieces and rounds. Although pipe lengths of 30 in. are useful for most tasks, it is quite simple to insert longer pipe rails for an unusually large job.

When not in use, the vise can be quickly dismounted by removing the two nuts from the eyebolts that hold it to the benchtop. It can be stored until the next time you need a good vise for a tricky hold.

The two small holes in the benchtop made for the eyebolts that hold the vise in place when it's being used don't detract from the general utility of the bench as a work surface once the vise is removed. ★★★

Материал, защищенный авторским правом

TAKE YOUR PICK...



A Pair of Famous

Hanover®

Shoes or Boots...

YOURS FREE!

I've given away thousands of shoes and boots to men who had the courage to face the fact that the only way to beat high prices is with more money. I've shown these men how they can earn up to $200 extra each month by showing friends and neighbors how to save $15 or more on high quality shoes. For proof, look at the comparison story on the right.

Jumping on the Hanover bandwagon is the simplest thing you can imagine—and it doesn't cost you a cent. Just mail the card at the right. It doesn't even need a stamp. I'll send you a complete selling kit including the full color Hanover catalog of more than 200 shoe styles and put you in business for yourself right now.

You'll find the Hanover catalog will let you offer your friends dress shoes and boots, casual shoes, slip-ons, work shoes, fleece lined boots for working outside or hunting. You don't "sell." You hand the catalog to a friend or co-worker, let him see the spectacular buys Hanover offers, and let the high quality of Hanover sell for you. I am not suggesting that you quit your regular job. Not at all. Right now I'm talking about a spare time business that will bring you extra income. But let me also tell you that the Hanover door is open to even more opportunities and more money. I'll show you how you can put yourself into the executive class at an executive's income. And I'll show you plenty of men who have followed this path with Hanover and are making more money than they ever made in their lives.

FREE SHOES

Free shoes? Sure. Send in the card and let me send you the selling kit. Take orders for just ten pairs of shoes in the first 30 days and you can have any shoe in the catalog selling up to $29.95 free. Of course you'll also get $40 or $50 in cash in commission, too. And keep your eye on the BIG payoff—the fact that this can be the start of your own business and a new life for you.

Gordon King
President

THE HANOVER SHOE, INC.
Hanover, Pa. 17331

THIS COMPARISON PROVES WHY HANOVERS ARE SO EASY TO SELL

One is a nationally advertised "big name" selling for well over $50; the other is a Hanover for just over $35.

COMPARE

1. **Uppers—Identical**
2. **Linings—Identical**
3. **Outsoles—Identical**
4. **Innersoles—Identical but only the Hanover has a cushion between the outsole and the innersole.**
5. **Steel Arch Support—Identical but the Hanover has a longitudinal arch cushion.**
6. **Leather Storm Welt—Identical**
7. **Laces—Identical**
8. **Fit—Made over identical lasts from the same last manufacturer.**

Fill in your name and let us give you more proof that Hanover shoes are a business man's "dream"—a better product at a lower price.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

NO STAMP NEEDED
Cut out and fold over. Glue or tape and drop in the mail.

First Class
Permit Number 54
Hanover, Pa.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

POSTAGE WILL BE PAID BY:

HANOVER SHOE, INC.
Gordon King, President
111 N. Forney Ave.
Hanover, Pa. 17331

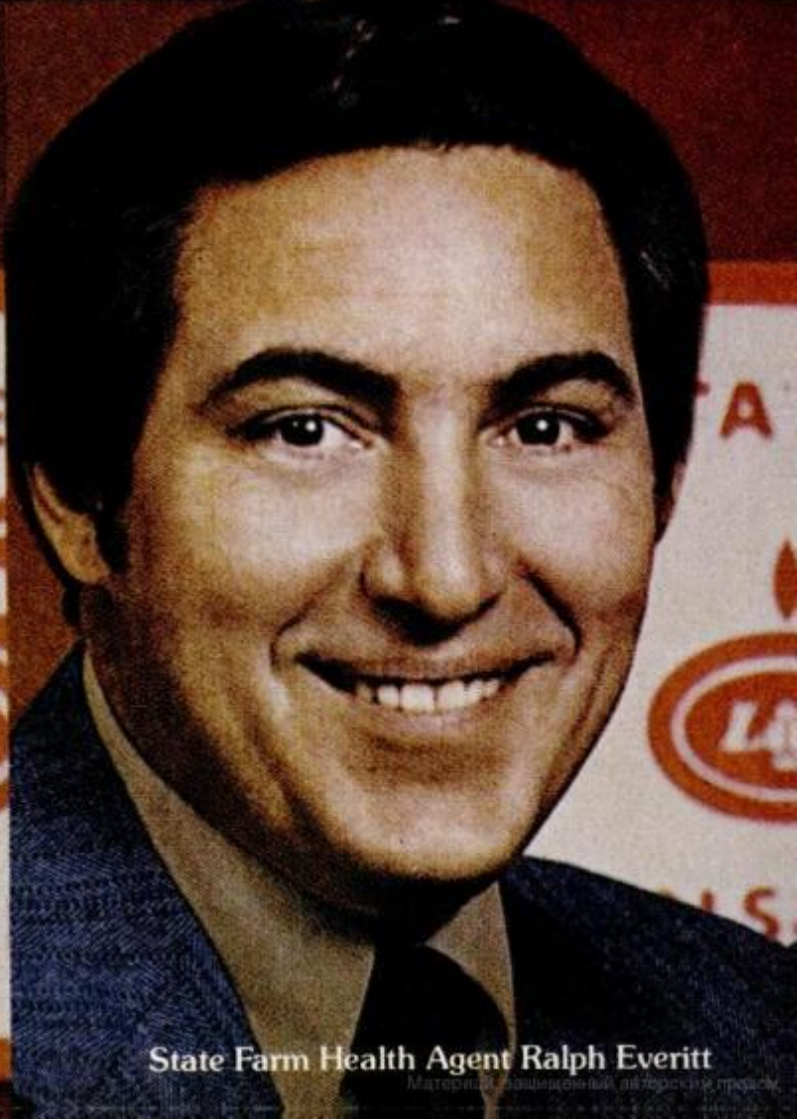
Dept. 1898

Материал, защищенный авторским правом

State Farm Life Agent Ralph Everitt

State Farm Auto Agent Ralph Everitt

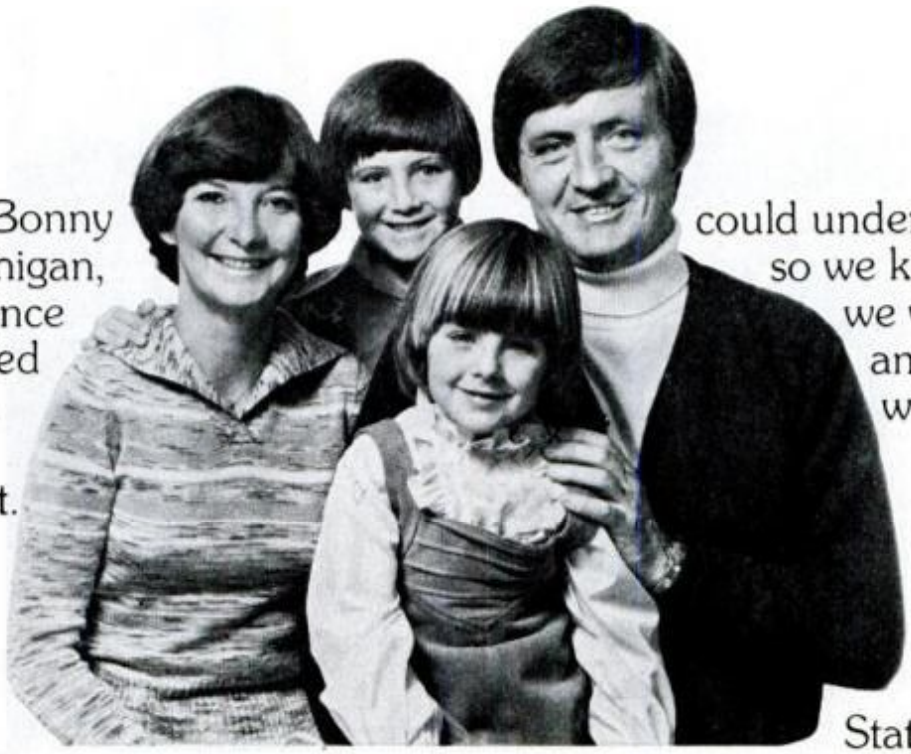
State Farm Homeowners Agent Ralph Everitt



State Farm Health Agent Ralph Everitt

Материал, защищенный авторским правом

The best man to see about your life insurance may be your car, home, or health agent.



Before Gary and Bonny Lepp of Troy, Michigan, chose a life insurance agent, they shopped around. And then decided they already had the best.

"We've had our home and car insured by State Farm for several years," says Gary, "and Ralph Everitt's always done a fine job as our agent. When it came time to look at a long-range life insurance plan, we compared the recommendations of agents representing some other well-known companies.

"But Ralph developed a program combining whole life with term insurance that we felt best met our financial goals for the future and stayed well within our means."

Bonny feels that Ralph "explained our life insurance in language we could understand, so we knew what we were buying and what it would do for our family.

"We just have a great deal of confidence in him, and State Farm, too."

So now, when the Lepps need help with any kind of family insurance—auto, homeowners, life, or health—they have one agent they can count on.

And only one phone number to remember.

Why not talk to a State Farm agent about a total insurance plan for your family? There's probably one like Ralph Everitt not far from where you are right now. Look him up in the Yellow Pages.

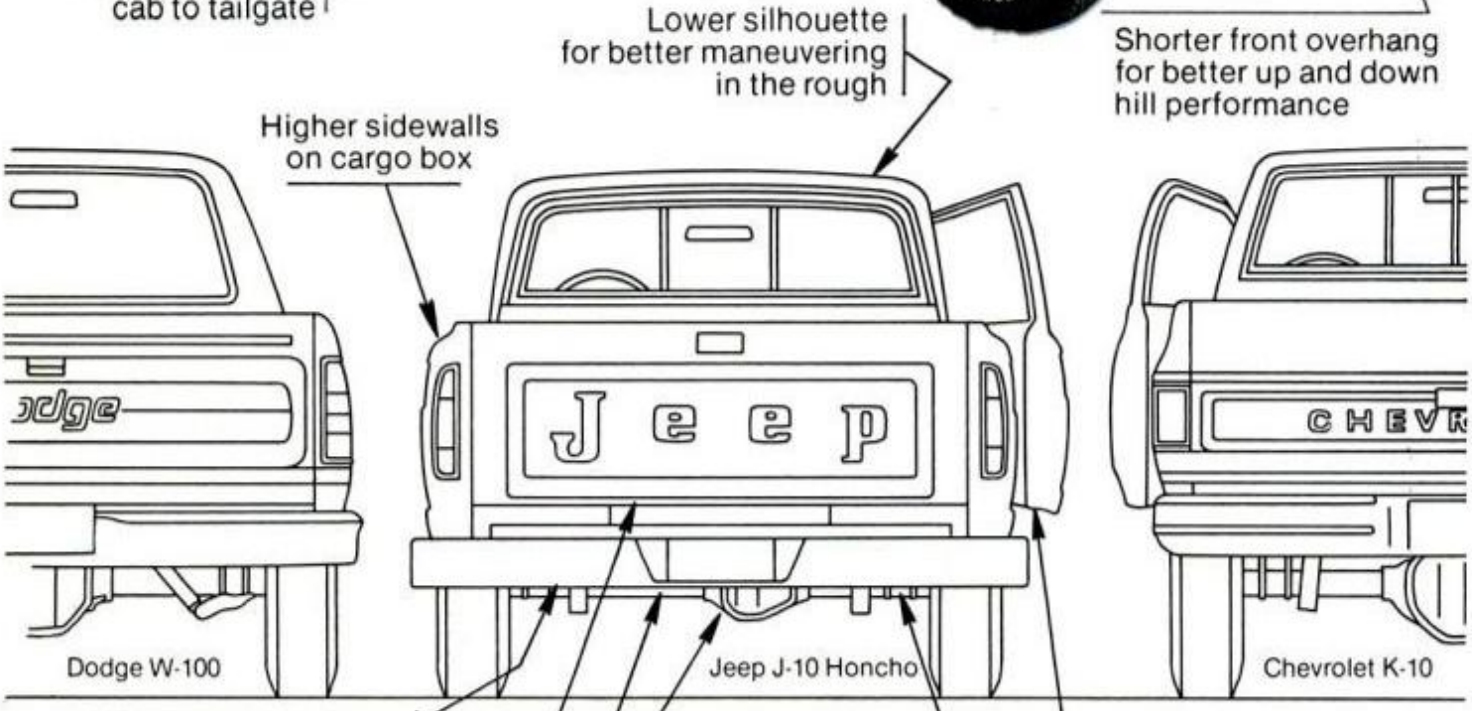
STATE FARM INSURANCE

Like a good neighbor, State Farm is there.

STATE FARM LIFE INSURANCE COMPANY Home Office: Bloomington, Illinois. In New York, Wisconsin and Connecticut, non-participating life insurance is offered through State Farm Life and Accident Assurance Company. Home Office: Bloomington, Illinois.

Материал, защищенный авторским правом

Jeep® Pickup puts down the facts... (and the competition)



Jeep

we wrote the book on 4-wheel drive

Only Pickup to offer Quadra-Trac®, Jeep's exclusive automatic 4-wheel drive system, considered by many to be the best system available

Jeep Corporation, a subsidiary of American Motors Corporation

Материал, защищенный авторским правом

Popular Mechanics

Sailing with Halley's comet— and other space spectaculars for the 1980s

The Jet Propulsion Lab's imaginative package includes a space sail that needs no fuel, a radar mapper to see through the clouds of Venus and rovers to explore Mars.

by John F. Pearson
SCIENCE EDITOR

As any bird watcher would be quick to confirm, purple pigeons don't exist. Not yet. Right now they fly only at the Jet Propulsion Laboratory—in the brains of scientists and engineers, in computers and on drawing boards. Still, they're a remarkable flock of birds.

Planners at JPL use "purple pigeons" as a tag for the unmanned missions they hope to launch in the 1980s. The projects would aim at further exploration of our solar system and would use—with one exception—spacecraft of conventional design. The one exception—the solar sail—is unlike anything ever put into space.

On a recent visit to the laboratory in Pasadena, Calif., I heard administrators, scientists and engineers talk enthusiastically about the sail, describing it as an exciting scien-

Photos and data from space flow into control center (left) at the Jet Propulsion Laboratory, Pasadena, Calif., as scientists monitor and guide missions within the solar system. Above: Solar sail nears Halley's comet in painting by Ken Hodges.

Материал, защищенный авторским правом

Countdown to new space spectaculars

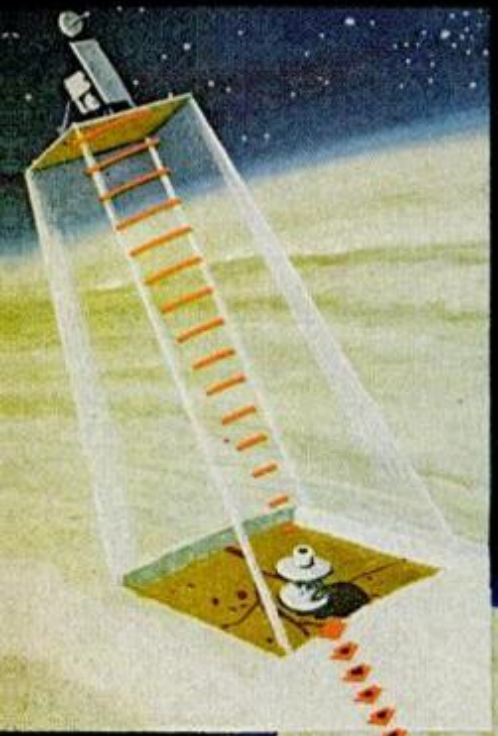
The men who gave us the Viking mission to Mars—scientists and engineers at the Jet Propulsion Lab—are cooking up new unmanned space spectaculars for the '80s. Here's a sampling of their way-out plans.

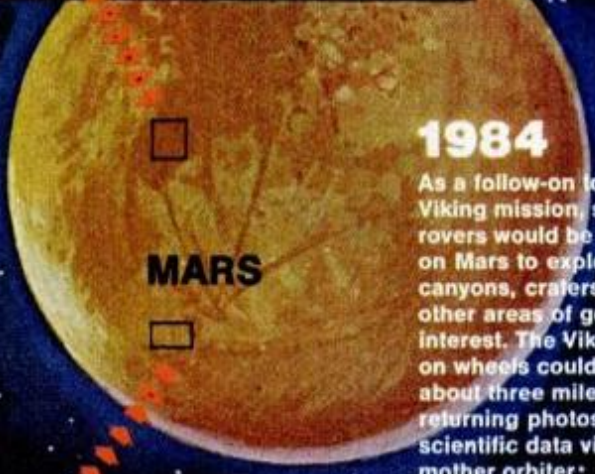
Beyond 1980s

When manned exploration of Mars becomes feasible, solar sails (right) could be used to land small powerplants, space vehicles and other vital payloads.

1981-1983

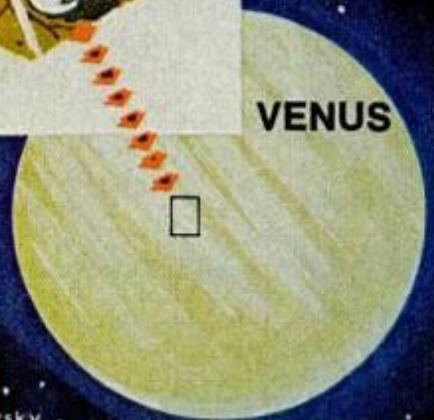
Radar-equipped orbiter (below) could penetrate dense clouds that hide mysterious Venus from standard cameras. At a distance of 625 miles, the orbiter could map planet's entire surface. An instrumented landing package could be dropped on the planet to carry out scientific studies.





1984

As a follow-on to Viking mission, small rovers would be landed on Mars to explore canyons, craters and other areas of geologic interest. The Vikings on wheels could cover about three miles a day, returning photos and scientific data via a mother orbiter.



PM art: Ed Valigursky

JUPITER

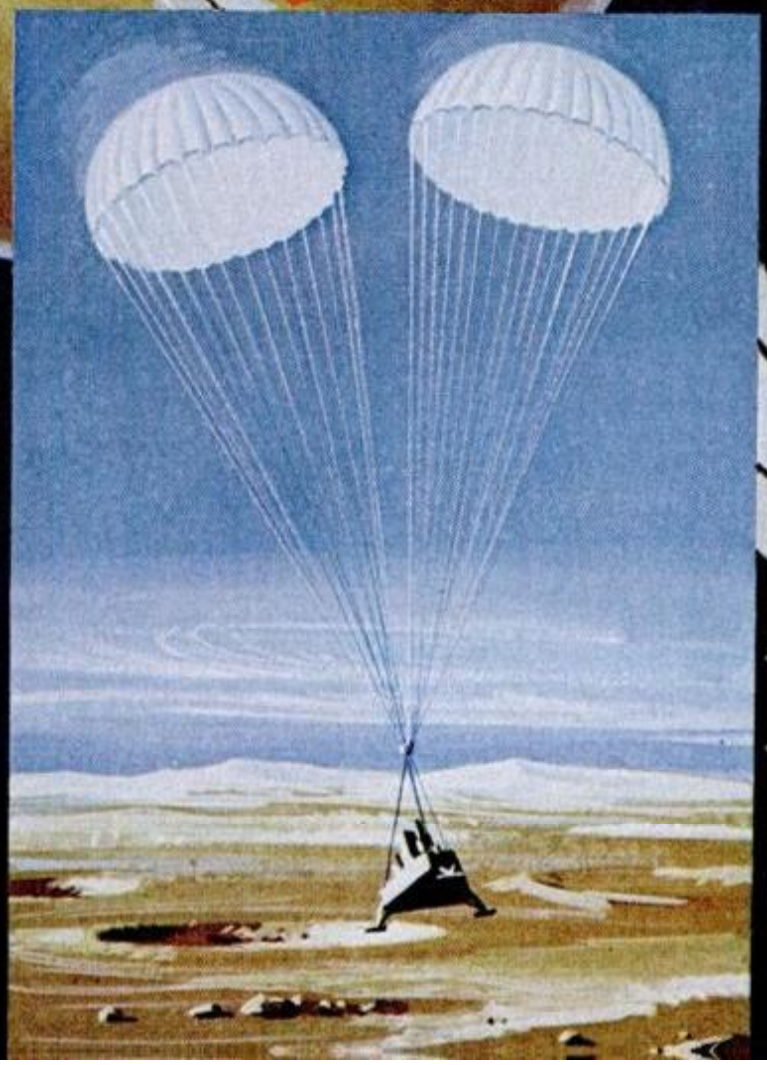
GANYMEDE

SATURN

TITAN

1980s

The frozen surface of Ganymede—one of Jupiter's large moons—is cracked by impact of small lander. Scientists say that it could be dropped from orbiting spacecraft sent to Jupiter and on a cruise of that distant planet's four major moons.



1980s

Spectacular Saturn has an Earthlike moon—Titan—with a heavy atmosphere. NASA and JPL scientists propose sending a Viking-type vehicle to search for possible life forms. Small lander would descend on Titan while mothercraft, in orbit around Saturn, would study planet.

Материал, защищенный авторским правом

tific concept as well as an idea that could stir the public interest.

The public's involvement is an important consideration with the people at JPL. This reflects the view of the lab's new director, Dr. Bruce Murray, who last spring created a task force to review old and new mission concepts and to debate their scientific value, feasibility and "pizazz." The idea was to weed out missions with little public appeal—"gray mice"—and focus on those that gave promise of drama and excitement—"purple pigeons."

Manned space ventures have built-in drama. Few TV viewers who watched Neil Armstrong take his first step on the moon will forget that exciting moment. There was great achievement in that step, but danger, too. In the back of the viewer's mind was the thought, "What if something goes wrong?" A mere machine on the moon would have been another story.

Machines are best bet

But for the foreseeable future, the only way we can explore the planets is with unmanned machines. As yet, we don't have the technical capability to send men to distant worlds. Besides, manned missions are far more expensive to mount than unmanned ones.

So the purple pigeons—or some versions of them—will be the way we'll explore the planets in the decades ahead. These missions will build on the technology and lessons learned from Viking and earlier projects. Viking was a much more difficult and sophisticated venture than Apollo. Landing men on the moon—in our own back yard—was easy compared to the task of sending a vehicle 460 million miles for a soft landing on Mars. The excellent photos of the Martian landscape produced by the Viking landers offer solid proof that machines can do a job in space.

When it comes to designing, programming and guiding unmanned space systems, no other group anywhere in the world can match the achievements of the people at JPL, a NASA-supported facility. JPL's experience goes back to the Pioneer, Ranger, Surveyor and Lunar Orbiter missions. In 1964, Ranger 7 sent back 4308 photos to give us our first close look at the moon.

Future space exploits will surely include at least several of the purple pigeons. The most unusual project of the whole flock has to be the solar sail. It was explained to me by Norman R. Haynes, a friendly, bouncy young man who clearly enjoys his work as manager of advanced programs development.

Photons, he told me, are what make the sail work. Scientists define photons as massless particles that carry energy and have momentum. When reflected, they change momentum and a force is exerted against the reflecting surface—like a wind against a sail. As photons stream out from the sun—and they are not to be confused with the solar wind, a flow of ionized hydrogen and helium—they have a measurable effect on objects they hit.

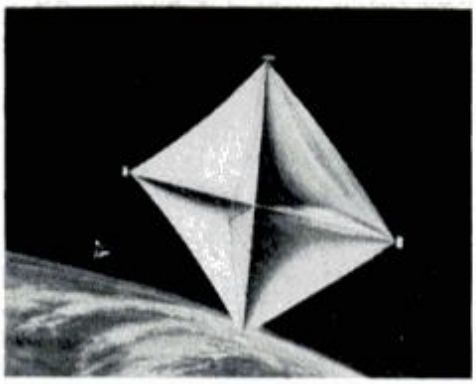
"When you calculate the trajectories to get from the Earth to Mars," Haynes explained, "you have to allow for the amount by which the craft is going to be pushed off course by photons—sunlight pressure. It will amount to from 10,000 to 20,000 kilometers. Keep in mind that the typical spacecraft is small and dense. If you have a craft that's very large and very light, it gets pushed around that much more."

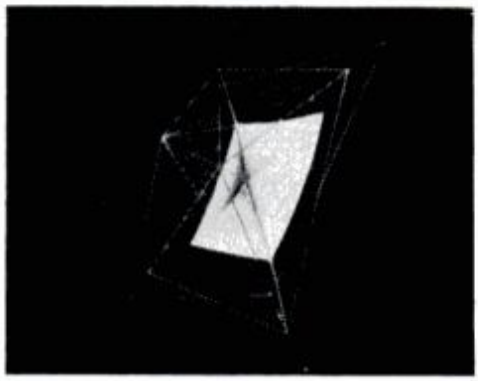
A big plastic kite

JPL scientists envisage a squarish sail measuring about half a mile on a side. It would be made of thin plastic film coated with aluminum to create a highly reflective surface. The sail would be supported by lightweight metal spars and look like a giant kite. At its center where the long spars are joined, a conventional spacecraft (such as a Mariner or Pioneer) would be attached. It would contain computers, communications gear and sensors.

Initially at least, the sail would be launched from a Space Shuttle Orbiter circling the Earth at an altitude of about 500 miles. Folded into a compact package, the sail would be removed from the Orbiter's cargo hold and deployed like a huge umbrella, with small motors pulling the spars out to their full length and stretching the sail over the framework. Then sunlight pressure would act on the sail, pushing it away from Earth in a spiralling orbit. Though the sail would be a relatively slow vehicle, at least as space speeds go, scientists calculate that it should be capable of attaining speeds as great as 35,000 mph.

Future space exploits will surely include at least several of the purple pigeons. The most unusual project of the whole flock has to be the solar sail.





One way of turning the sail is to deploy small vanes at the corners, as shown in top illustration. Vanes would be controlled by onboard computer. Above: Following Earth launch, spars are extended and sail is in process of unfurling.

Rocket propulsion systems have fuel limitations that rule them out for missions of long duration. Until the sail came under study, NASA was concentrating on another concept: solar electric propulsion. This system uses solar cells to convert sun power into electricity. The electricity is then used to ionize a propellent—vaporize it into individual atoms. The atoms are fed into engines that accelerate them out through the back of the spacecraft, providing thrust.

Big decision coming up

"It appears that by the end of this fiscal year NASA will make a decision on which system—solar electric or solar sail—will go into development." That's the opinion of Jerome L. Wright, manager of JPL's solar sail task force. "It isn't likely," he explained, "that both will be developed. They're just too close in performance to justify that. NASA will probably go with the one that offers the greater mission application, better performance, lower cost and the wider public appeal."

Wright thinks that the sail may have a significant performance advantage over solar electric propulsion for long-duration missions. "Except for its attitude control system," he said, "the sail is completely passive. It doesn't generate electrici-

Материал, защищенный авторским правом

ty, there are no ions being accelerated, there's no exhaust."

The sail could become the reusable interplanetary shuttle of the future. It could deliver payloads to the inner planets—Mercury, Mars and Venus—and return to Earth with scientific samples, delivering them to an Earth-orbiting lab. JPL scientists calculate that the sail could carry a 10-ton payload to Mercury and at least 5 tons to Mars.

The system could also be used for missions to asteroids and comets, and for swing-by missions to the outer planets. (But the sail's performance at the outer reaches of the solar system would be diminished because of the weaker sunlight pressure there.)

Tacking toward the sun

Even though the sail is pushed by energy radiating from the sun, it would still be capable of flying toward the sun. The sail would turn so that it would "tack" into the photon stream. Two methods are under study for turning the sail. In one, lanyards pull in the outer edge of one side of the sail, creating an imbalance. As a result, a greater solar pressure is exerted on the fully extended side, causing the sail slowly to change attitude.

The second method would employ four small vanes, one at the tip of each diagonal spar. Control would be achieved by deploying two vanes on the same side, for example, and leaving the other two in the "down" position. The deployed vanes would create the desired imbalance. All such operations would be under the control of an onboard computer.

A rendezvous with Halley's famous comet is under consideration as the sail's first mission. It's a difficult feat—the comet is a high-velocity object with an orbit in the opposite direction from Earth's—but the sail, scientists say, has the unique capability to do the job. Once in orbit with the comet, the sail would be jettisoned, and the instrumented spacecraft it had carried would tag along in the comet's gaseous tail.

To make the rendezvous, the sail must be launched in 1982. It would encounter the comet in March 1986—34 days after the comet makes its closest approach to the sun.

I asked Jerry Wright why JPL had such an interest in comets. "You might say that they have been in cold storage since the birth of the solar system," he said. "Particles that were formed then are still in the comet and are unchanged. No planet remains unchanged. Halley's is the biggest, most active comet we have any chance of getting to."

'We'd like to have an electron microscope aboard for a look at those dust particles. We'd be seeing particles formed at the birth of the solar system.'

Dust, rocks and gases

He explained that comets have two main constituents: rocks and dust, and frozen gases. When the comet nears the sun, the gases vaporize, creating a bright coma at the comet's head and a fiery tail.

"The gases pull dust with them—and everything gets blown out into space," Wright said. "Instruments on the spacecraft would collect samples of what comes out. We'd like to have an electron microscope aboard for a look at those dust particles. We'd be seeing particles formed at the birth of the solar system."

The other purple pigeon projects high on the JPL list include:

■ Four small automated rovers to explore Mars. This would be a logical extension of the Viking Lander missions. The vehicles would be equipped with cameras, "mini-labs" and manipulator arms for sample acquisition and handling. They would travel in pairs so they could work together in certain experiments. A good time for launch, according to JPL scientists, would be in February 1984.

■ A spacecraft launched in 1983 would arrive at Jupiter in 1985 for an inspection tour of its four major moons (first discovered by Galileo). Photos of their surfaces would be obtained and overall chemical compositions determined. Finally, the orbiting spacecraft would drop a lander on the moon Ganymede, establishing an observatory there capable of studying the planet as well as its other moons.

■ Saturn and its planet-sized satellite, Titan, have long interested astronomers. A spacecraft launched at the earliest opportunity, 1985, would arrive at Saturn in 1990. Saturn is nearly a billion miles from Earth. In orbit around the planet, the spacecraft would observe Saturn's rings, atmosphere, radiation environment and satellites. After a few weeks, a daughter spacecraft would separate from the mother ship and land on Titan.

"Titan is probably the most interesting satellite in the solar system," Norman Haynes explained to me. "Almost the size of Mercury, it has a thick atmosphere containing hydrogen and methane—gases in the Earth's original atmosphere. The surface probably contains a lot of water, frozen solid. These are all conditions that indicate a possibility of life."

■ A spacecraft could be placed in a circular orbit around Venus as early as 1981, but another good opportunity appears in 1983. The craft would use a scanning radar system to map the planet's cloud-covered surface.

Though JPL scientists have come up with other new missions, the five purple pigeons described here are the ones they're most enthusiastic about. All five are scientifically sound and aimed at increasing our knowledge of the solar system. The possibility of learning more about how the Earth was formed should interest the American public. At least that's the hope of the space experts at JPL. ★★★

The weak signals from distant spacecraft are picked up by this 210-foot-diameter dish at Goldstone, Calif. Similar antennas in Australia and Spain take over as Earth rotates.

Sporty low-wing two-seater is designed for fast cross-country flying as well as limited aerobatics. Called the Barracuda, it takes engines from 180 to 300 hp. In prototype form, it has 220-hp Lycoming. Cruise is 200 mph, top 218, yet it lands at a tame 64 mph. Construction is all wood with fabric covering, features retract gear. Span, 24 feet, 9 inches; length, 21½ feet; gross weight, 2300 pounds. Plans are $125 from Geoff L. Siers, 5415 West Tapps Dr., Sumner, Wash. 98390.

If you don't recognize this bird, it's because it's been given a colorful personality all its own. Actually, it's a two-place open Pietenpol tricked up to look like WW I fighter with round tail, "elephant ear" wingtips, dummy bomb. Paul DiMascio of Boyertown, Pa., did the job for $3500, including a 125-hp Lycoming engine. Max speed is 125 mph; span, 29 feet; length, 19 feet. Plans for original are $15 from Pietenpol, Spring Valley, Minn.

They fly what they build

When you have to get in and fly something you've made yourself, you know it has to be designed and built right. Here's a look at some of the latest, most colorful homebuilt aircraft. You can build many of them yourself from plans or kits.

by Sheldon M. Gallager and Howard Levy

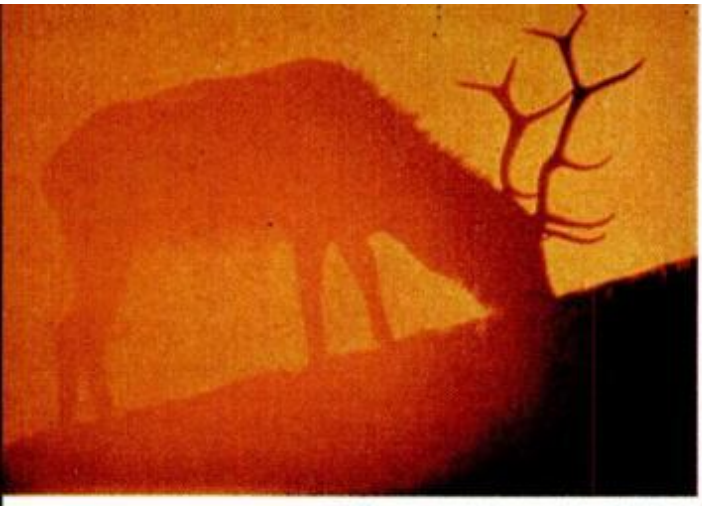
RAF markings help identify this famous flashy fighter as slightly modified 3/5ths-scale WW II Spitfire. Engine is 100-hp Continental; max speed, 150 mph; span, 22 feet, 1½ inches; length, 19 feet, 4 inches; construction, wood and fabric; cost, $3500. Craft has air brakes, is aerobatic. Plans $200, John O. Isaacs, 42 Landguard Rd., Southampton S015DP, England.

From autogyro to helicopter: Igor Bensen's famous Gyrocopter is on its way to becoming a true helicopter. It's done by adding twin coaxial rotors (above) and a second engine to power them through a chain drive. (The current Gyrocopter has a single unpowered rotor.) The rotors contrarotate to cancel out torque, eliminating the need for a tail rotor. (Steering is done by a conventional rudder.) The present pusher prop will be retained for forward thrust, but the added rotor power will enable the craft to make vertical takeoffs and landings in a small space with no runway. Called the Hovergyro, the new version will sell in kit form for about $5000. Kits will also be available for converting existing Gyrocopters to rotor power. Max speed is 65 to 70 mph; rate of climb, 600 feet per minute; range, 120 miles. Bensen Aircraft Corp., Box 31047, Raleigh, N.C. 27612.

Modified Evans VP-2 (right) sports an added bubble canopy, full electrical system and other refinements, but can be built from stock Evans plans. Craft is the handiwork of aviation instruments designer William Stilley of Milwaukee, cost about $6500. It gets 90 mph from a modest 65-hp Continental, climbs 400 f.p.m., has range of 200 miles. Span is 27 feet; length, 19. Original design is two-seater, but Stilley cut out one seat for baggage room. Plans for open-cockpit version are from W. S. Evans, Box 744, LaJolla, Calif. 92037.

Yep, it's another Bede—this time the BD-7, a four-place beauty that closely follows the sleek, bullet lines of the smaller single-place BD-5. Like the BD-5, it's powered by a pusher prop in the tail. Prototype uses 180-hp Lycoming for top speed of 199 mph, but other engine options range from 100 to 200 hp. Cabin interior is nearly 4 by 8 feet for roomy comfort despite compact design. Span, 24 feet; length, 20.51 feet. Kit, less engine, about $4560. Bede Aircraft, Inc., Newton Municipal Airport, Newton, Kans. 67114.

PM photos: Howard Levy



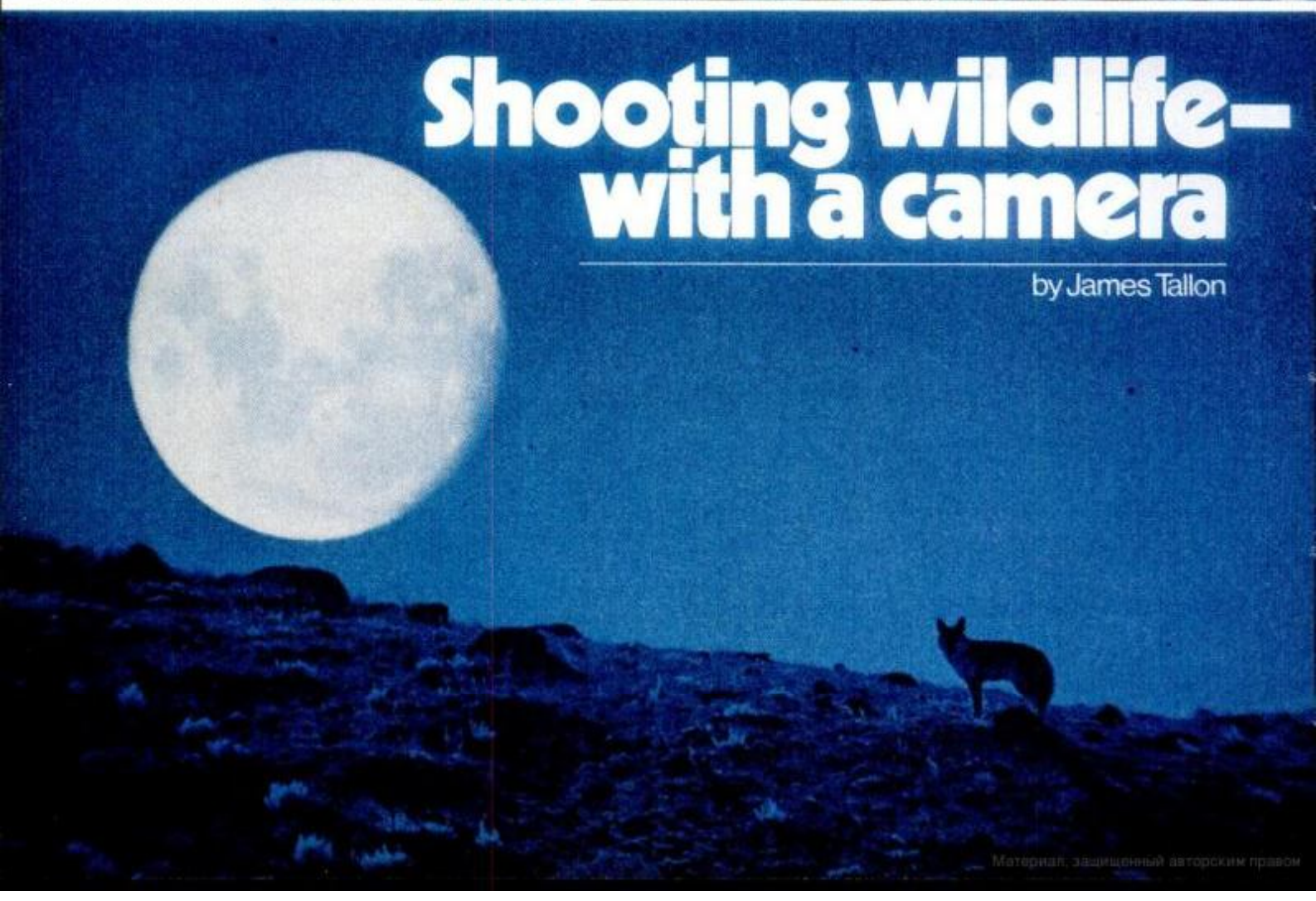
Long telephoto lenses are a wildlife photographer's most useful tool, keeping you far enough away so as not to frighten your subjects—and to let you shoot bear (left) and mountain lions (above) without their frightening you. The author finds that 400 mm is about the most useful focal length for wildlife shooting.

Photos by the author

Portable "blind" (camouflage netting) hides author from animals he's shooting (right). Elk (above) and coyote (below) were shot through deeply colored filters usually used with black-and-white film. Moon in shot is actually on a separate slide, sandwiched together with the coyote shot.

Shooting wildlife—with a camera

by James Tallon



Материал, защищенный авторским правом

It was a shirt-sleeve fall morning and Bob Hirsch and I were on the Papago Indian Reservation in Arizona trying to lure coyotes into photo range. Bob sat under an ironwood tree, wrapped in camouflage netting. I was stationed about 75 feet away, more netting covering me and my tripod-mounted reflex with its 400-mm telephoto lens, so that only the lens's glass eye was exposed to the outside world.

Suddenly the morning stillness was shattered by the scream of a rabbit in trouble—it was Bob, using a commercial predator call, a tube of wood with a tuned reed inside. (This mouth-blown instrument will draw in quite a few animals and birds, including such non-predators as deer, javelinas, wild burros, and even songbirds.) The screech from these calls always makes the back hairs on my neck stiffen, and they were just starting to get limber again when I saw something that stiffened them in earnest: a coyote, traveling full-bore toward Bob's back.

The initial idea—getting both Bob and the coyote in the same shot—seemed a shoo-in. But my friend seemed unaware that the animal had zeroed in on his back. And callers *have* been bitten by their callees.

I wanted the picture badly—but I didn't want Bob hurt. I made a split-second decision to snap off a couple of fast shots the instant both Bob and the coyote were in my viewfinder, then shout a warning. I swung the camera to follow the animal.

But as I swung, it did a tricky two-step. Instead of my expected side view, I now had a front view of it—*front* view? Yikes! The coyote had picked a new target: me. Its supersensitive hearing had picked up the slight rustle of the camouflage material, and it no doubt assumed its easy meal had moved.

I was using a follow-focus lens, one with a pistol-grip, squeeze-focusing device that lets you pop the lens from its 27-foot minimum focus to infinity in a

Good shots depend on good lighting, good composition—and good luck. It also helps to know animal habits—when the geese migrate, for instance (above). And you have to be prepared to make your own luck by being ready when the animals are.

Action, like the two bull moose above, makes good wildlife shots. So do static shots, if they are composed well, as at right. When possible, choose a simple background, too, to concentrate attention on your subject. If you can't, simplify the background by throwing it out of focus (long lenses help with this).

Close-ups make good portraits of animals (above). Don't be afraid to leave space around your subjects, to show surroundings. Moody moose shot (left) is an example. Note, too, use of reflection in water, silhouette lighting; not all light need come from over the shoulder.

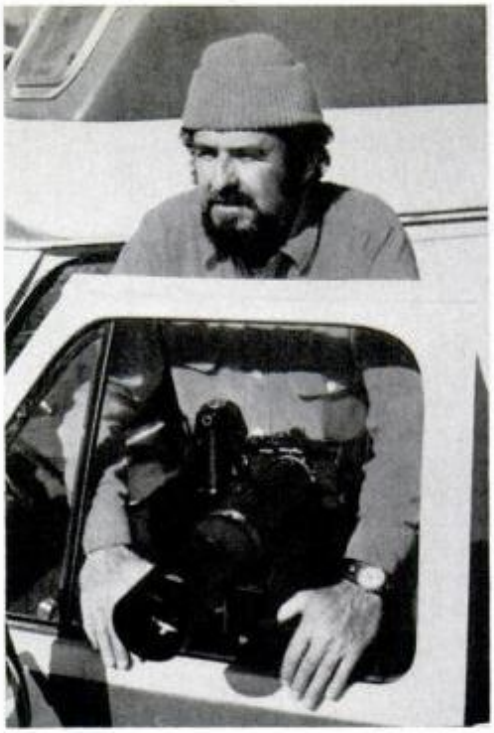
Материал, защищенный авторским правом

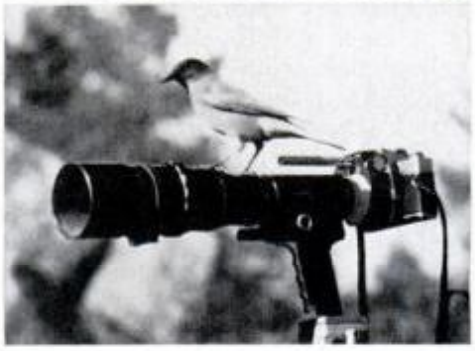
fraction of a second. But the coyote was coming at me so fast my adrenalin valve had opened all the way I was shaking so badly I couldn't get a sharp image on the ground glass.

The wind was coming from the coyote's direction; the animal couldn't smell me. When it was just a few feet from me, I screamed—not from fear, mind you, but to let the critter know a human, not a rabbit, occupied the camouflage.

The coyote's intent expression turned to one of pure shock. It performed a half-gainer and then sped off, spending more time in the air than on the ground. Bob howled in laughter.

That was just one of my many wildlife adventures in more than a decade of outdoor shooting. Nearly every trip afield produces some kind of excitement—including that of the pictures I bring back.





Author uses many tricks to get his shots. He uses his car not only for transportation but also (above) as a rolling tripod and wildlife blind. Hidden bait drew the pinyon jay (right) to perch on the author's follow-focus 400-mm lens; a second camera —always good to have—took the shot. Loudspeaker (above, right) broadcasts wildlife cries from portable tape recorder to bring animals into camera range.

What to shoot with

As with any vocation, certain tools and knowledge are needed to break into wildlife photography. I know wealthy people who were able to start with sophisticated motor-driven cameras and thousand-dollar lenses—but you can give them a lot of competition for about $200 and some know-how. My first wildlife outfit was a single-lens reflex that cost just over $100 for the body, plus a 350-mm telephoto that I haggled down to $90. Remarkably, you can now buy 400-mm telephotos—a more practical focal length—for about half that price new.

Once you have camera and lens, all you need add is film and you're equipped to take wildlife pictures. I recommend, however, that you buy a tripod and a bellows, as soon as possible. Both are relatively inexpensive. The former will enable you to take sharper pictures and the latter lets you break the close-focusing barrier inherent in most telephoto lenses.

Where to shoot

The best places to shoot wildlife pictures are national parks and monuments and other sanctuaries. Wildlife in them becomes, in varying degrees, adjusted to man's presence. Often these birds and animals will pose for portraits better than children do. It must be remembered, though, that animals are unpredictable. A deer, for example, may pause for pictures one day but take flight the next. Animals, birds, reptiles, amphibians and insects have predictable habits as a species, but individually they don't.

Wildlife refuges of some sort exist in every state in the Union. In those where the bigger animals—bear, elk, moose, buffalo—roam free, the pursuit of wildlife photography can be hazardous. In a less wild environment, birds and animals become less afraid of man.

Yellowstone National Park is one of my favorite spots for wildlife photography. A big animal habitat visited by thousands of people who have been raised on a diet of Disney's talking animals, the park is an excellent place to see the chances novice photographers will take.

Near Mount Washburn one summer day, I found a road blocked by a "bear-jam," a pile-up of vehicles whose drivers have stopped in the middle of the road to see or photograph a bear. The culprit who caused it all was a two-thirds-grown female black bear, a roadside beggar. Despite red-printed National Park Service warnings not to feed bears or approach them too closely, dozens of people were in flagrant violation. One young man grabbed an ear of the bear while his friend tried to snap a shot of him doing it. The animal whirled and lashed out with four-inch-long claws at the man's face. I expected to see horrible mutilation, but the bear missed him by a scant fraction of an inch.

The bear-approachers on Mount Washburn exhibited sheer foolishness, but shooting pictures of wildlife always involves some risks, no matter how careful or how experienced the photographer may be.

When in doubt, duck!

Approaching Brooks Lake in northwestern Wyoming's Rocky Mountains, I followed a cow moose into the forest and lost track of it. Then I saw a pair of eyes hurtling my way with 1000 pounds of animal attached to them. I stepped behind a Douglas fir and the critter passed close enough to touch. I didn't get its picture, but I was all right.

Cow moose are quick to charge when they think their young are threatened. So when a curious calf saw me trying to shoot it and its mother against a background of Yellowstone Park spectators, I shooed it away. Luckily, mother had her head down, feeding. But the calf came back, and this time the cow saw me.

Again I had a half ton of irate animal thundering toward me. I had an escape route planned: back into the safety of the woods at the edge of the meadow. But just inside, I jumped on a damp deadfall and my feet went out from under me. I ex-

(Please turn to page 138)

Материал, защищенный авторским правом

IT'S NEW NOW

Super stern-wheeler for the Mississippi

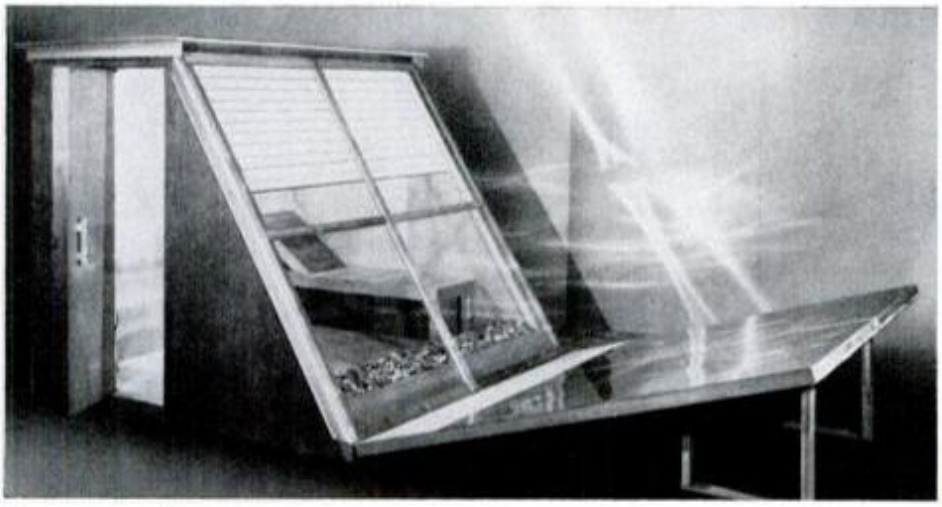
First overnight Mississippi passenger boat to be built in 50 years, the paddle-wheeler *Mississippi Queen* would have Mark Twain gasping in awe. Stacked seven decks high, she boasts a swimming pool, automatic elevators, beauty shops, bars, restaurants, posh lounges and brass-trimmed grand staircase. She's 379 feet long, 68 wide and is propelled by a 35x25-foot steam-driven paddle wheel powered by oil-fired boilers. Her crew numbers 125, and she accommodates 500 passengers.

Electric-powered model planes

Battery-operated control-line airplanes are the latest in flying-model circles. New Electro-Charge craft, 13 inches long with 16-inch wingspans, are powered by motors driven by nicad batteries recharged from a safe 6-volt supply. Three models—"Fireball" P-51 Mustang, "Racer" and "Spitfire"—available at toy and hobby centers. L.M. Cox, 1505 East Warner Ave., Santa Ana, Calif. 92705.

Dog turns on lights

Thieves may think twice when they hear your dog bark and see lights go on in the house as well. A sensor called Barklight plugs between lamp and outlet and turns on the light when triggered by a dog's barking. The light stays lit for 60 seconds after the barking has stopped. It costs about $40 from Crime Stoppers, Box 67141, Los Angeles, Calif. 90067.

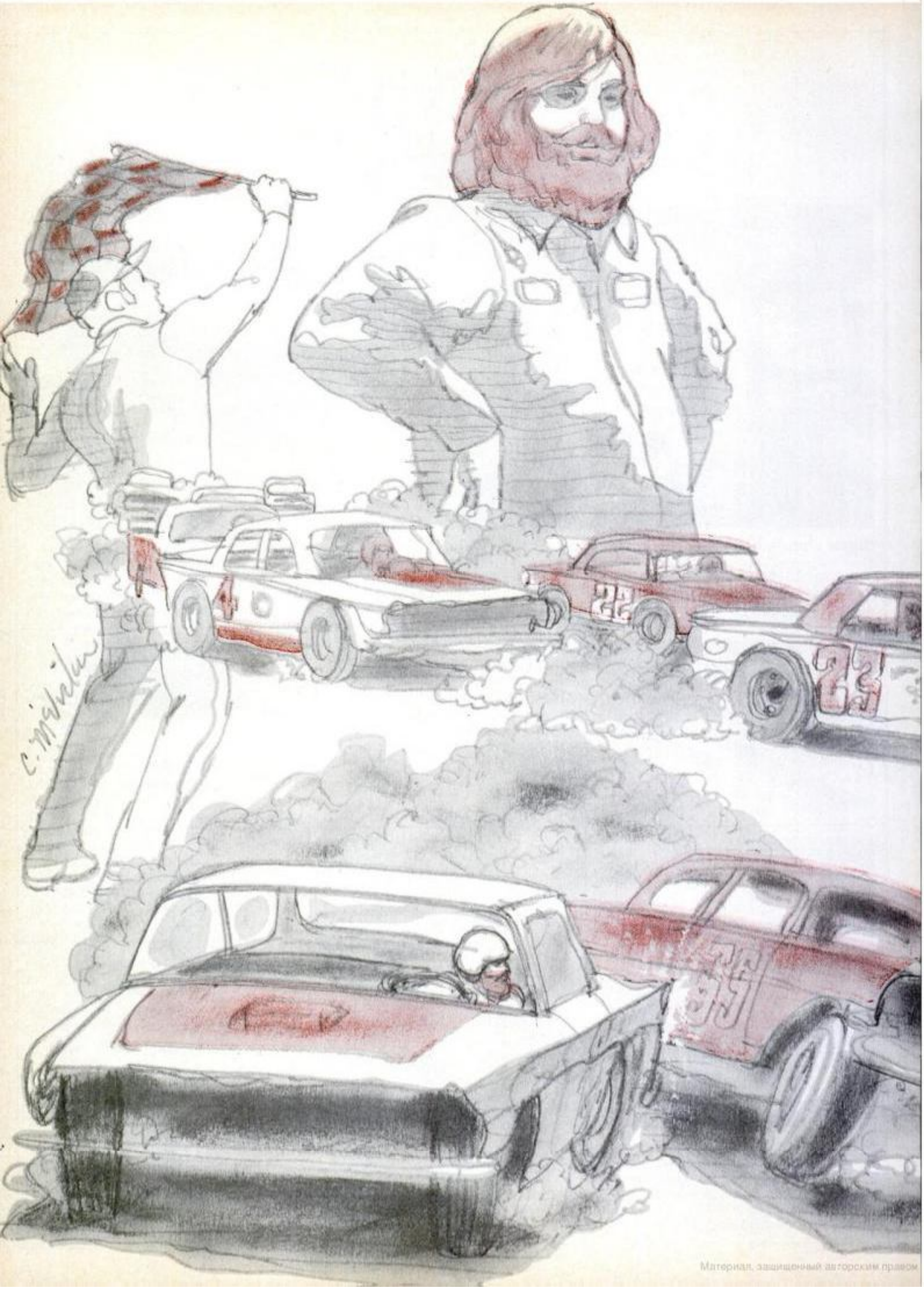


Sun-warmed sauna

Using "greenhouse effect" to warm things up, a new Solar Sauna needs no fuel. The 8 x 8-foot unit has a hinged reflector that drops to a 15° angle, directing sunlight to the urethane-insulated interior through plastic, heat-trapping panes. Result: 180°F. inside when it's 47°F. out. A bed of rocks holds in heat overnight. Priced from $1495 up. Am-Finn, Seventh and Washington, Red Hill, Pa. 18076.

Jig those mitered frames

Gluing mitered joints on picture or cabinet-door frames is easy with a new Porta-Press. Pivoting corner clamps self-adjust from 8x8 to 36x48 inches to hold work square. Universal Clamp, 6905 Credos, Van Nuys, Calif. 91405.



Материал, защищенный авторским правом

Hot dogging it in the bullring

In auto racing it's the local short tracks—or bullrings—where the action is.

by Bill Kilpatrick

PM art: Chuck McVicker

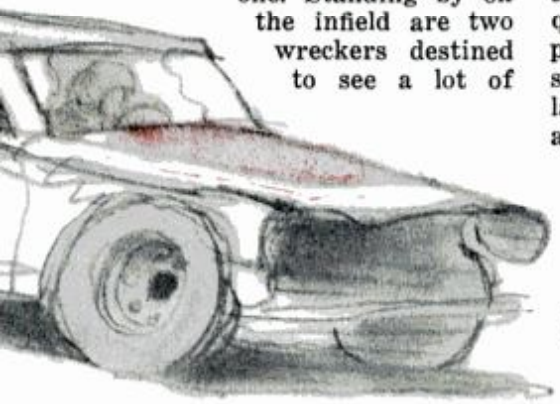
It is a warm Saturday night in August and a friend and I are sitting in one end of a peeling-paint grandstand at a small "bullring" racetrack in the Connecticut boonies.

Down in front of us on Turn One of a quarter-mile, slightly banked oval of dimly lit asphalt, 14 or so rather sorry-looking "race cars" are jamming through the bend, hoping to emerge reasonably intact. For a moment they look like a pack of amusement park dodge-ems run amuck, and I feel myself cringe every time they give each other a rap.

First qualifying heat

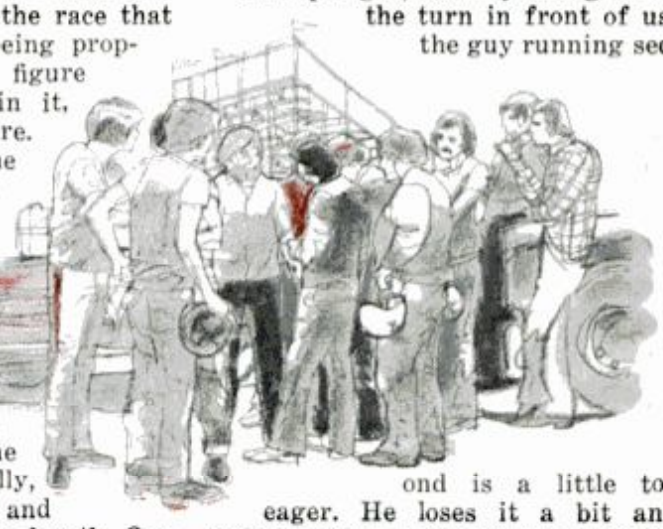
Each driver has his eye on finishing sixth or better in this first of two 10-lap qualifying heats that will determine who gets to run in the feature. Winning the heat is pure glory, no money, and even if a guy goes on to win the feature, all he takes home is $100, so the motivation can't be to get rich. Here, the siren call has to be to gain experience and—maybe—a bit of fleeting and strictly localized fame.

This is stock-car racing so minor league it is sanctioned by no one. Standing by on the infield are two wreckers destined to see a lot of action, and an ambulance, which may or may not.



The thing is, a pleasant young fellow we know is out there trying to survive the mayhem with a minimum of wrinkles and shake-ups to what a blaring and fuzzy public address system assures us is "car number 23, a Ford driven by Larry Ross of Southport." We know he and the guys in his crew have worked hard all week in their spare time to get the car ready for tonight, and it will be a shame if some turkey, staggering all over the track, takes him out of there. Our friend has about the only car in the race that comes even close to being properly set up, and we figure he's duck soup to win it, at least make the feature.

As the cars come around on the second lap, Ross has moved from seventh to fifth. In the process he has been bumped a couple of times, one a teeth-rattler from behind. He cuts through Turn One quickly and economically, picks up another car, and slips into a comfortable fourth. One lap later he's running third, nibbling almost leisurely at the rump of the second-place car.



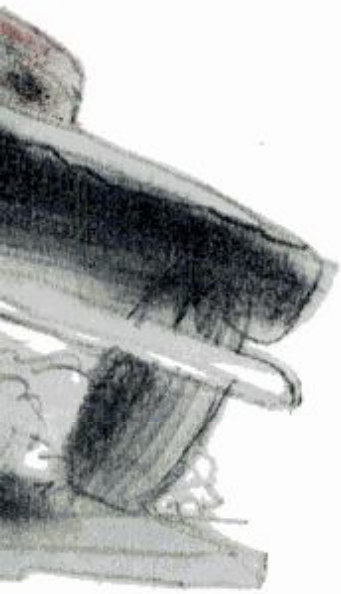
Race continues

Halfway around the track in front of him two also-rans "get married" and on go the caution lights. We see a frustrated Ross slap his steering wheel; he's running strong, and the last thing he wants to see right now is the yellow flag.

But the "marriage" is brief. Within a few yards, one car careens onto the infield, presumably out of it, and the other wobbles on down the track, its driver fighting to hold things together. One of the infield wreckers shoves the debris out of range and, after a lap-and-a-half on the caution, the starter is frantically waving his green flag, signaling the resumption of the race. Ross stands on it and the Ford flies.

On lap eight, as they charge into the turn in front of us, the guy running second is a little too eager. He loses it a bit and swings wide up toward the marbles. Ross zaps by on the inside and starts chewing the leader. He shoots high out of Turn Two, trying to take the guy on the straight, and even though he stays loud deep into Turn Three, he has to back off and let his man get away.

I'm on my feet, screaming to Ross to stay put, for a moment forgetting that a race driver is a race



Материал, защищенный авторским правом

driver, period, and the reason he's out there is that he has to blow the doors off everything in sight.

Last lap

Back at Turn One on the gun lap, Ross keeps his foot in it until the last possible split-second, then slices across the leader's nose, receiving for his effort a thumping rap in the left rear, shunting him somewhat out of shape. But Ross recovers nicely, gets the car sorted out and rolls home to take the checkered flag.

It was, of course, a nothing race won by a journeyman driver in a once-was '62 Ford, the body of which looks like recycled washboards, but I'm tickled pink. I know I've got a big grin plastered all over my face, and anyone looking at me would think my guy had just won the Big One at Daytona. Looking around me, however, it's all too plain that this place and the racing we have just seen are light years away from Daytona and its tinseled thunder.

Plainville Stadium, just off Interstate 84, is about 10 miles southeast of Hartford. If you didn't know where to turn, you might have trouble finding it. We saw only one sign —a small, black A-frame perched in front of a gas station, its chalked legend reading, "Plainville Stadium. Racing Tonite. 8 P. M." As an afterthought at the bottom of the sign there was a chalked arrow indicating we should turn left.

The Stadium isn't a stadium at all. There's the guard-railed racetrack, a single county fair-type grandstand, a couple of unspeakable restrooms, a handful of competing refreshment stands, and, outside the surrounding fence, a dusty, open-field parking lot.

Hybrid cars

The infield occasionally offers attractions other than wracked-up race cars. On this night, for example, several posters, plus a scratchy recording played over the PA system, tout a shabby, mud-show circus slated to open at the Stadium the following week. (Looking out at the dust and dirt and the litter and the general seediness, it seems an unlikely locale for the promised "pree-meer" acts the recording assures us are "direct from the capitals of Europe.")

Racing at Plainville runs on Saturday nights from spring until fall and usually features hybrid (often wildly and ingeniously so) modifieds and a class of stock cars the local promoter calls "pleasure" cars that at other tracks might be classified as Hobby or Novice/Sportsman. They are cars nearing the end of their racing lives driven by drivers just a notch above out-and-out novices.

The 'pleasure' class

The "pleasure" class can—and now and then does—include cars that once might have competed (or have been built to compete) on NASCAR's Grand National circuit. The emphasis at Plainville, however, is on modifieds, the drivers of which compete for purse money of anywhere from $500 to $750 or $300.

But Plainville, like other tracks throughout the country offering similar racing programs on any given night of the week, encourages participation in the lowest, or "pleasure" class, the idea being to provide "on-the-job training" for drivers who just might attract a loyal following of fans, and who might one day move up to modifieds. With this in mind, local rules are designed to hold the costs of racing to a minimum. For example, at Plainville "pleasure" cars must run on retreads; new racing tires are forbidden. Similarly, all engine parts must be off-the-shelf stock. Such exotica as racing cams and special headers are taboo. Teardowns to insure compliance with the rules—particularly if a car wins handily—are random and frequent.

As might be expected of racing on this level, its fans are, in general, a yeasty lot. The crowd seems to consist of young couples and family groups, often including toddlers, even infants.

How Larry began racing

Larry Ross is the proprietor of an Arco gas station in Southport, Conn. He and his guys pump a goodly amount of gas, but the main business is car service. He enjoys a good local reputation as being a straight-shooter and a fine mechanic. Although he has been involved in one way or another in racing for more than 10 years, he has been driving for only the past two.

"It's something I guess I've always wanted to do," he says "and finally, a couple of years ago, I took the plunge. We bought the car's chassis for $50 and built it from the ground up, working from photos, sketches and information we got out of magazines and from what we'd picked up from working on race cars and from hanging around racetracks. I know it doesn't look like much, but we've got over $3000 just in the car. If I've learned anything over this past couple of years, it's that there's no such thing as racing on the cheap."

Tires alone cost $1400

Ross estimates that it costs about $2000 a season to run his car at Plainville. For this past season, his tire bill alone was $1400, and that's at $40 a pop for retreads as opposed to $110-125 for new rubber. Engine parts he scrounges from junkyards, parts suppliers and friends.

"We're running a 390 engine, so parts aren't too hard to get," he says, "but there are times—usually when I'm going over my books—when I think a lot of 'em must be made out of pure gold."

In addition to the car itself, Ross has close to $2000 wrapped up in a converted school bus used to transport car, crew and spares to the

Материал, защищенный авторским правом

track. An admittedly tired '68 Dodge, it cost Ross $550.

"But, like Topsy, it sort of 'growed,' and while it's no beauty, it at least keeps things warm and out of the rain."

Racing with a partner

Ross races with a partner named Ken Barta, who has been driving three years. Under the banner "Ros-Bar Racing," a legend appearing prominently on the sides of their converted bus, Ross and Barta field a two-car team, both in the "pleasure" class. Barta also drives a Ford and this past season finished third in the overall point standings at Plainville.

"I haven't got the exact numbers," Ross says, "but Kenny and I figure we came fairly close to breaking even for the year, which in this business means you've had a successful season.

"Next year, if a couple of things fall into place and we're lucky enough to pick up a little sponsorship, we intend to race a four-car team, one of which will be a modified. Another fellow is going to drive the extra stock car, and Kenny and I will work it out as to which one of us gets to drive the modified, which we're both hot to do.

"Look," Ross adds, smiling, "I'm 29 and Kenny's 26, and if either of us are ever going to go anywhere in this business, we've got to start trying to move up to a better class of racing."

Ross admits to having his eye on Grand National racing, but recognizes and respects the odds against his ever getting a crack at it.

"The woods have got to be full of guys, a lot of 'em younger than I am, who'd like the same thing, and I know most of us aren't ever going to make it, but heck, just *once* before I quit I'd like to get a ride in a dynamite car.

"I suppose a lot of people would think that sort of thing is crazy," Ross says, "but it's my dream, and to me it's as good as any."

The feature

It is now a little past 9:30, and intermission at Plainville—a sort of seventh-inning stretch during which fans cruise the refreshment stands and hit the biffys, or simply wave to each other and visit—is just about over. The first half of the program ran three heats of modifieds and two heats of "pleasure" cars, so everybody knows the drivers who will run in the features, and the crowd is anxious for things to get underway. First one, then two, then several engines in the pit area fire into action, and the circus record is summarily silenced as the announcer comes back on to herald the start of what he says promises to be "slam-bang racing action."

Because Ross won his heat and Barta finished second in his, the partners will be running against each other in the stock-car feature. They've found themselves in this situation many times, and it puts no strain on their friendship. In fact, because Barta is still a contender for the season's point championship, Ross—barring his own chance to win—will do all he can short of bold-faced obstruction and foolish driving to help Barta take the checkered flag.

Starting way back

One by one the cars in the feature roll onto the track from a gate near Turn Two and accelerate off down the back straight. They zap around, often weaving back and forth to heat and scuff up their tires before falling into some semblance of order for the parade lap. Starting positions have been determined by a system Ross has decided is pretty much the promoter's whim. At best, it appears to be a rule-of-thumb handicap scheme aimed at giving every driver a crack at winning while at the same time giving Plainville's fans the sort of racing action they expect to see. Both Ross and Barta are slotted well back in the pack.

The first attempt at a start is a fizzle; two cars tangle just as the green flag drops and must be pried apart. On the second attempt at a start, a third car accelerating out of Turn Three plows into the wall and has to call it quits for the night. By now the fans are laughing and hooting, shouting both encouragement and abuse at the cars as they straggle by to get themselves lined up again.

Finally, as the cars roll out of Turn Three, the starter waves his green flag and the drivers pour it on as they head into Turn Four and shoot down the grandstand straight. The roar of their acceleration down the straight is followed by chirps and grinds and groans as the cars brake and set up for Turn One.

A close call

Ross and Barta both pick up a couple of cars as they rifle through the bend, but Ross has a close call. One car on the inside is chattering through the turn, its rear end hopping out in a wide, bouncing arc that almost nails Ross. He receives only a slight thump, however, scoots through the loop at the end of the track and pops into fifth place. As the cars hurtle into and through Turn Four, which we can't see because it's off to our extreme left, we hear a bang and see the caution lights flash on. Along with everyone else, we stand and look, our necks craning to see what has happened. Apparently there has been some kind of a smashup. The cars back off and roll through our end of the track as the red lights halting the race come on. No Larry. For a moment, my stomach turns, rollcage or no rollcage. I've only just met the guy, and I like him, and I hope nothing has happened to him.

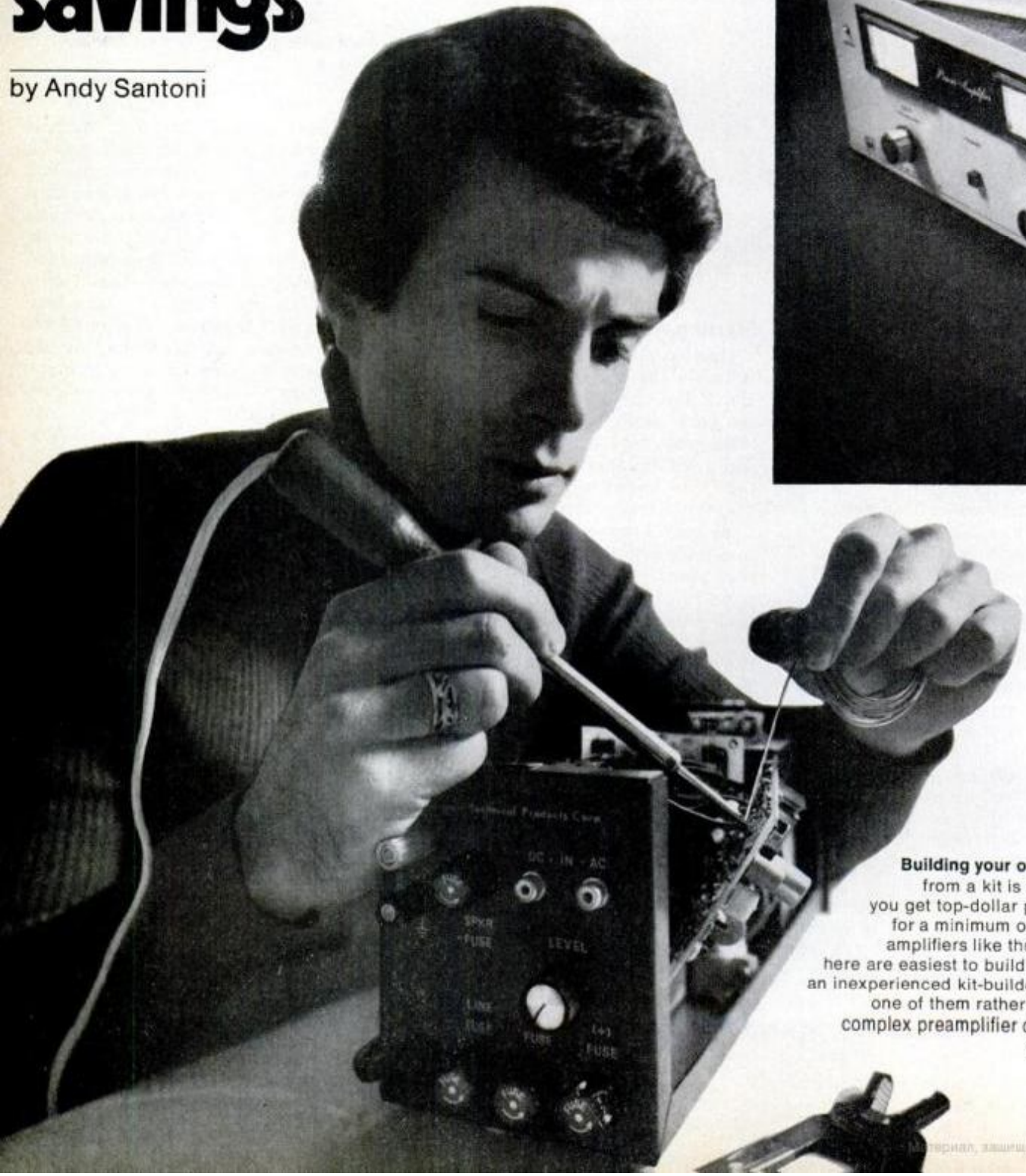
One of the infield wreckers moves up and onto the track and disappears from view behind the knot of fans who have run down out of the stands and along the fence to see what has happened. In a few minutes, the wrecker comes back into view, dragging behind it a wrinkled "car No. 23, driven by Larry Ross of Southport." It then dawns on me that the ambulance hasn't moved, so things can't be too serious. In a moment we see an unhappy Larry Ross being hauled by in the car, his dejected eye on a right front tire and wheel buried in a mashed fender at an

(Please turn to page 148)

Amplifier kits: Good sound with built-in savings

by Andy Santoni

PM photos: Steve Fay



Building your own amplifier from a kit is fun, and lets you get top-dollar performance for a minimum outlay. Power amplifiers like the one shown here are easiest to build; so if you're an inexperienced kit-builder, start with one of them rather than a more complex preamplifier or integrated amplifier kit.

Материал, защищенный авторским правом

Amplifier and preamplifier kits, far left from top, are Ace Zero-Distortion preamplifier, $90; Ace 35X2-watt amplifier, $150; Dyna PAT-5 preamplifier, $239; Dyna ST-300, 150X2-watt amplifier, $399; Heath AA-1640, 200X2-watt amplifier, $180 (35X2-watt version, $130); Southwest Technical Products 207/B, 60-watt monophonic amplifier, $78; Schober TR-3M, 70X2-watt amplifier, $176. Below: Heath AP-1615 preamplifier, $130; Heath AN-2016 Modulus tuner/preamplifier, $600-770; Dyna ST-400, 200X2-watt amplifier, $584 with optional meters shown.

Most of us would love to own the ultimate amplifier for our hi-fi systems, with knobs and switches enough for total control and enough power to drive any speakers to ear-crunching volume. What stops us is the price.

But you can get a lot more amplifier for a lot less money if you make one from a kit—and you'll make yourself a few evenings' fun in the bargain. Most amplifier kits, especially those from the major hi-fi kit companies, look good, sound right and hold up for years. (And if they do give trouble, most kit manuals—especially Heath's—tell you how to track the trouble down and cure it.)

How much do you save by building an amplifier from a kit? About one-third the cost of the same amplifier in a wired version. And since wired versions, when available, are generally competitive in price with similar units not in kit form, you can truly save yourself a bundle—several hundred dollars in the case of some top-of-the-line, high-power amplifiers.

Which amplifier is for you?

Kit or wired, amplifiers come in two basic types: "integrated" models, with both the controls and the speaker-driving circuitry in one box, or "separates," with the preamplifier stages and controls in one box and the speaker-driving circuits in another.

Integrated amplifiers are least expensive and easiest to hook up and use, which makes them the most popular type of factory-wired amplifier. But with more circuitry in one box, they're a bit harder to build from a kit, and the build-it-yourself savings are less with less expensive components, so most amplifier kits are separates.

Separate preamplifiers and power amplifiers are usually easier to build than integrated amplifiers. In fact, power amplifiers are the simplest and easiest hi-fi kits. Preamps, though, are only a bit easier than integrated amps.

The prime advantage of separates is flexibility. You can choose a combination that most closely meets your needs and fits your wallet. Also, you can change it easily if your requirements change.

If you live in a small room and use efficient speakers, you can mate a low-cost, low-power amplifier with a complex and expensive preamp that gives you all the control features you want, such as monitoring and dubbing facilities for two or more tape decks, two turntable inputs and switching for external graphic equalizers (page 188, Nov. '76) or noise reducers (page 82, Aug. '75). Or you can get a preamplifier with a minimum of controls and a low price. Then, if you need to drive a pair of inefficient

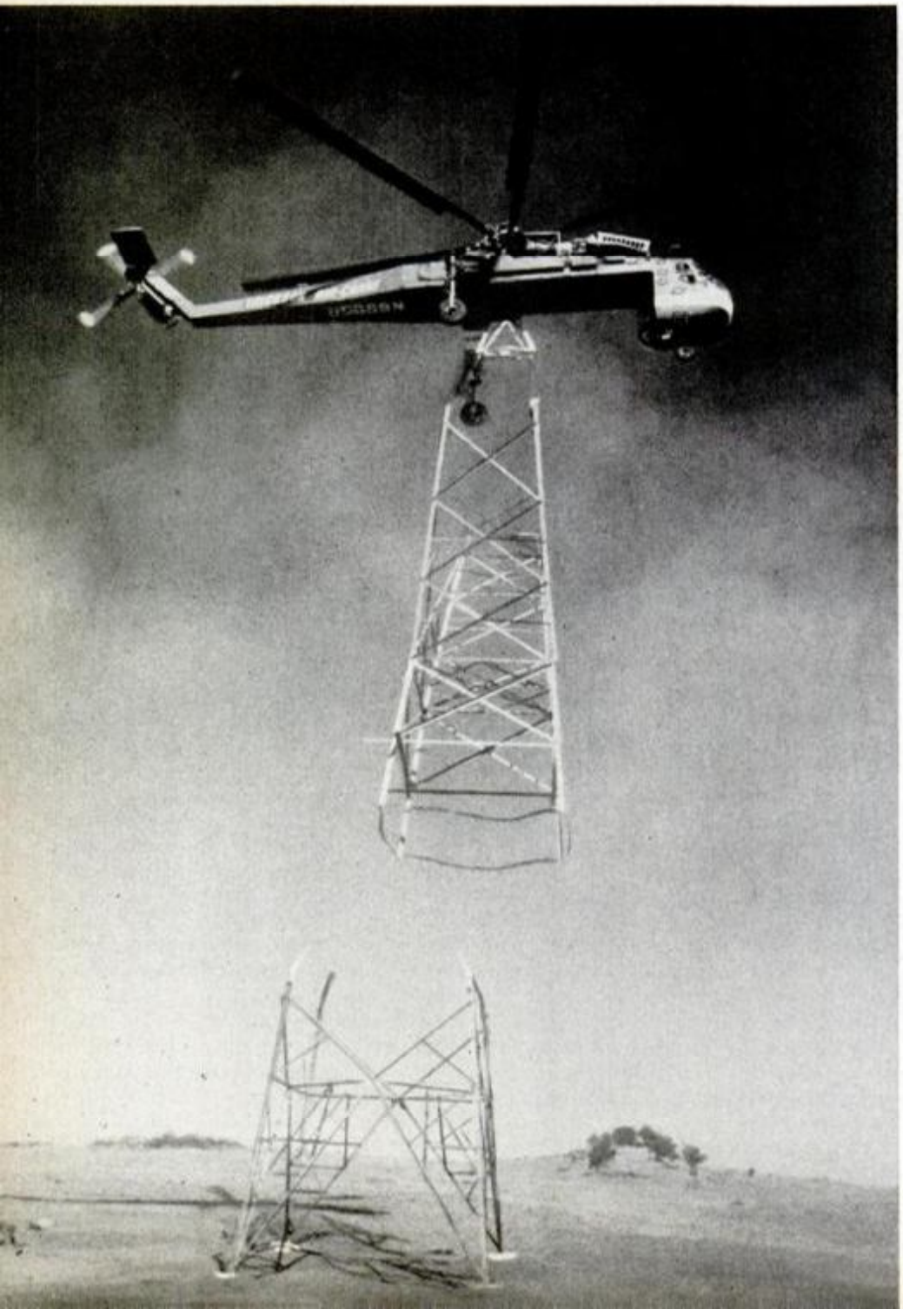
(Please turn to page 166)

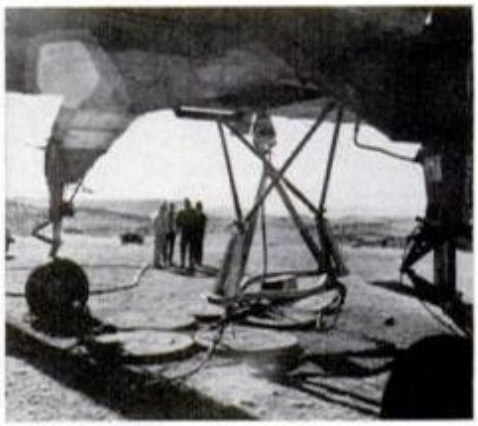
Материал, защищенный авторским правом

The chopper they call when the chips are down

This odd-looking helicopter has proven itself as an Army workhorse, super construction crane and ace unloader of ships' cargo. But the Skycrane's most impressive feat was putting the top on the world's tallest structure.

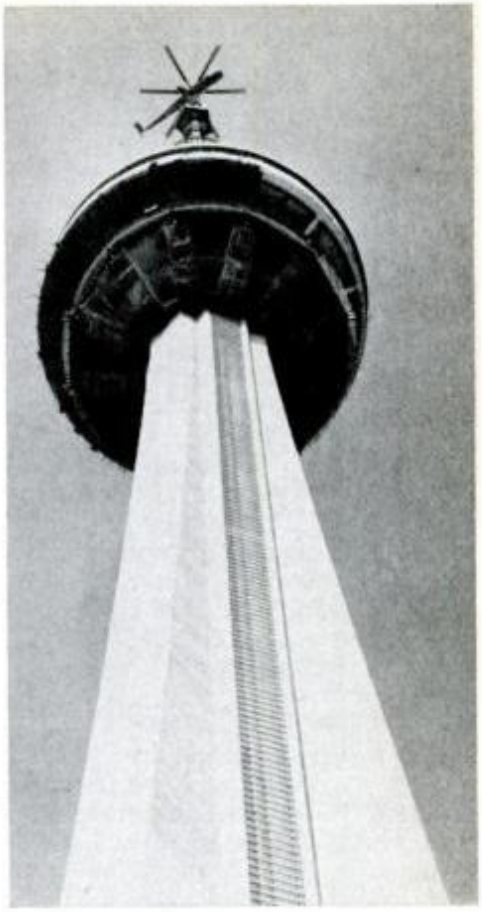
by John F. Pearson
SCIENCE EDITOR



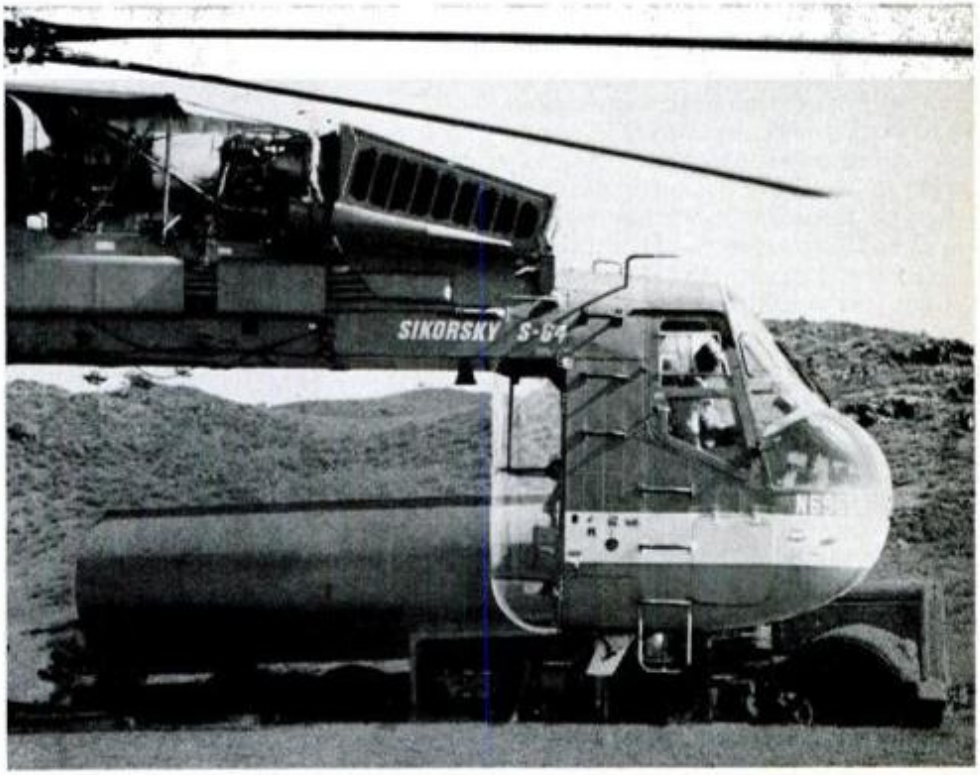


In the aft pilot's seat, Larry Pravecek "flies the hook" (top photo). The angled guide—a key device in the installation operation—can be seen attached to tower section lying on ground (middle photo). Other vital pieces of gear are the cage and spreader bar underneath the fuselage (above). Left: Copter airlifts section.

Материал, защищенный авторским правом



The wide view of fish-eye lens—used in a camera rigged to Skycrane's fuselage—makes it possible to see CN Tower, landing gear and cage (at top) and aft pilot (at bottom). Top, right: Skycrane hovers over 1805-foot tower in Toronto. Right: Time out for refueling during operations near Laramie, Wyo. Dave Kohornen keeps eye on things from forward pilot's seat, but the aft control position is unoccupied.



The six-bladed rotor was turning, cutting a 72-foot-diameter hole in the air of Wyoming. A mechanic scrambled up a broad, angled landing-gear strut for a close look at the rotor hub on top of the fuselage. This was routine takeoff procedure—an oil leak would signal trouble.

The mechanic climbed down, waggled his hand (everything was okay) and kicked away the wheel chocks. Pilot Dave Kohornen eased on the power. The rotor bit into the air—and we lifted off. Within seconds we were skimming the sparsely grassed plain south of Laramie. The Skycrane was off to do a day's work.

Looks like a big bug

In profile, the Sikorsky Skycrane has to be one of the oddest-looking planes ever built. It has a bulbous nose, a long, thin fuselage and wide-stanced, oversized landing gear. Aloft, it resembles a giant mantis. But the craft makes up in strength and stability what it lacks in looks. It can pick up and carry up to 10 tons under its flat belly and deliver the cargo with pinpoint accuracy, as I would see for myself.

The Skycrane is unusual in another way, too—it has an auxiliary control position. In addition to the two forward piloting positions, there's an aft seat where another pilot looks out toward the tail through a large plastic bubble that runs from above his eye level and curves under his feet, giving him a bird's-eye view of the cable coming out of the plane's fuselage, the cargo hooks and the cargo. From here, you "fly the hook."

On this run, Larry Pravecek was in the aft seat. Larry is a lanky man in his mid-30s, a friendly sort who's logged over 2000 hours in Skycranes. He's a former Sikorsky test pilot, and people at Sikorsky describe him as "one of the best in the business."

Perched on a step leading to the forward part of the cockpit, I sat next to Larry and shared his view

aft. Pilot Dave Kohornen—a former Navy flier who sports a luxuriant blond mustache—was up front in the right forward seat.

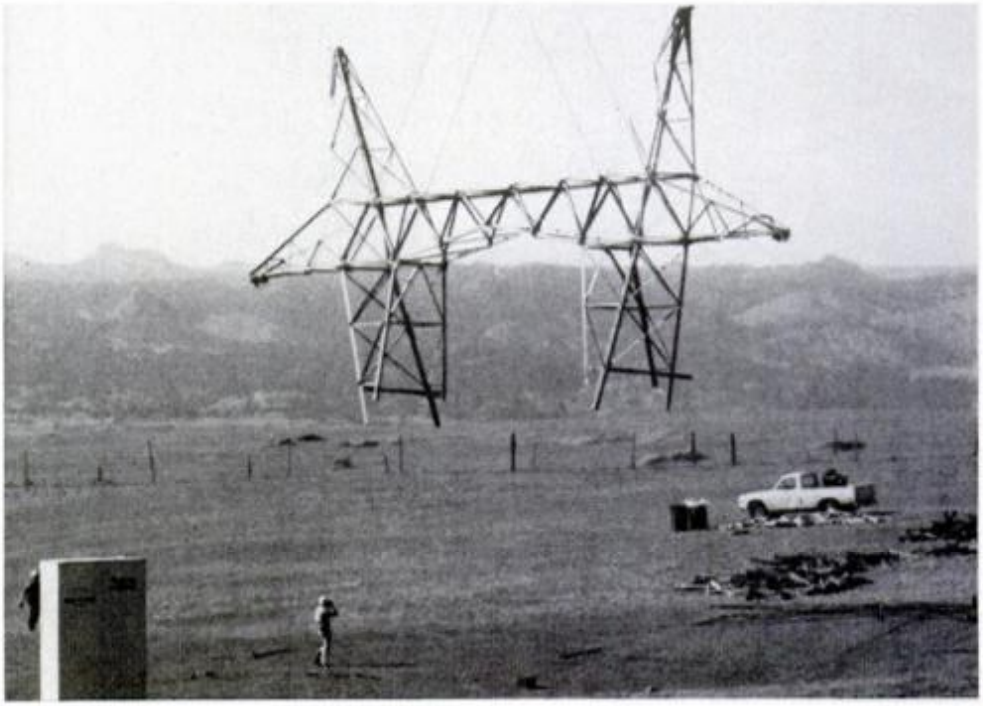
Larry and Dave fly for the Erickson Air Crane Co. of Hillsboro, Ore. Erickson owns three Skycranes, using them primarily for lumbering and installing powerline transmission towers. The current job involved a 140-mile stretch running from southeastern Wyoming into northern Colorado. They had been working almost three weeks and completed over 30 miles of towers.

Erickson is a contracting company that does the whole job of installing powerlines—from putting in the concrete footings for the tower legs to stringing the wire. Jack Erickson, the head man, regards the Skycrane as another tool. "It lets us do the job a lot faster," he says.

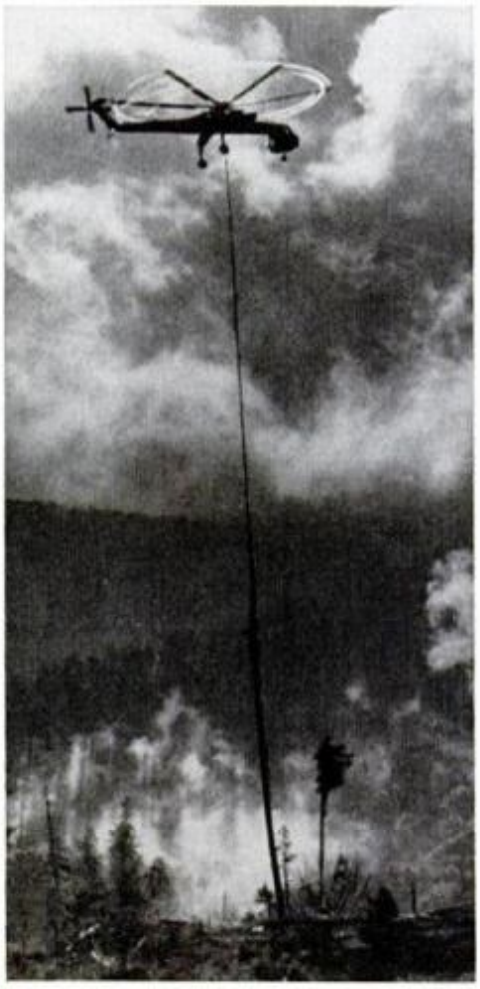
Towers assembled in yards

The typical Erickson operation involves establishing a marshaling yard every 10 miles along the powerline route. Tower sections are assembled in these yards. There usually are three sections—legs, body and bridge—for each tower. The bridge is the wide top section from which insulators and electric conductors hang. Normally, five towers are set for each mile. In the marshaling yard, tower sections are tagged according to location. Sections marked 10/1, for example, make up the first tower in the 10th mile; 20/3 designates tower 3 in the 20th mile.

On the current job, the Erickson crew was working the section between the 30 and 40-mile markers. Larry told me that the first few lifts would be for installing bodies and bridges on legs already in place.



Making it look easy, Erickson's Skycrane carries an 8000-pound bridge section over Wyoming plain as powerline job progresses.



The big-muscled bird has proven useful for placing heavy equipment on rooftops (below) and for selective logging (right). The Sikorsky Skycrane has two 4500-hp turbine engines, a 72-foot-diameter rotor and boasts a maximum speed of 126 mph and a range of 230 miles. The helicopter is capable of transporting 10-ton cargoes.

In this type of operation, incredibly smooth teamwork is needed. Wearing intercom-equipped helmets, the two pilots talk almost constantly—and not about the weather. Though they face in opposite directions, each knows exactly what's going on at any given second. I was wearing a headset, too, so I could listen in.

Dave flew the big chopper up to a couple of hundred feet, then made a beeline for the nearest marshaling yard to start in where they'd left off the previous day. Larry consulted a chart. "Start with 34/2," he said.

In the yard area, the chopper hovered over a bridge section. When we were in good position, Larry said, "I've got it," and took over with his controls. Riggers on the ground grabbed the helicopter's four cargo hooks and snapped them on cables attached to bridge section 34/2. Larry told Dave to take over, and off we went, the Skycrane not even breathing hard.

Within minutes we were hovering

(Please turn to page 152)

Материал, защищенный авторским правом

FIRSTHAND REPORT

by Michael Lamm
WEST COAST EDITOR

Driving the new 30-mpg Gremlin

American Motors's new four-cylinder engine is just what the Gremlin needed.

Improved economy, handling and modest price make restyled Gremlin Four a good value.

I had a chance to drive the new four-cylinder Gremlin in Southern California recently. Frankly, I'd expected a not particularly inspired car to be made even less so in the new version.

But to my complete surprise, the lightweight four-cylinder AMC engine takes this car out of the "makeshift" category (it is, after all, a chopped-tail Hornet) and makes it —at last—an integrated, pleasant-to-drive, economical machine—something it should have been from the beginning.

First, let's talk about performance. I drove the Four with both the manual four-speed transmission and the three-speed automatic. Acceleration with the Warner four-speed feels amazingly strong; actually, it probably *feels* stronger than it is—in the same way as the old VW Beetle. Zero-to-60 mph time and quarter-mile elapsed time take exactly one second longer with the Four than with the 232-c.i.d. Six (16 vs. 15 seconds and 21 vs. 20 seconds, respectively). That's not half bad considering the gain in fuel mileage.

The Warner four-speed has long, long second and third gears that wind out to an uncomplaining 50 and 70 mph. This means good passing in tight highway situations. I recommend the four-speed over the automatic for all-around performance and gas mileage.

On the topic of economy, I averaged 28.7 mpg in normal driving. This was with the automatic. About half that came in town, the other half on the freeway. AMC pegs the numbers at "up to 25 mpg in city driving and 35 mpg in the highway cycle."

What about handling? It's better with the new four-cylinder engine than with either of the first two—the in-line Six and last year's 304 V8. The Six (actually in two displacement versions, 232 and 258 c.i.d.) is still available, but not the V8. Both those powerplants tended to make the Grem nose-heavy. Handling never did feel right, nor did

(Please turn to page 144)

Gremlin's new, four-cylinder, in-line powerplant is an overhead-cam design that originated with Audi. It lightens front end, giving the car better handling.

GREMLIN ENGINE COMPARISONS

	AMC Four	Base AMC Six
Engine type	In-line Four, belt-driven overhead-cam, cast-iron block, aluminum crossflow head, five mains, water cooling.	In-line Six, pushrod overhead valves, cast-iron block/head, seven mains, water cooling.
Displacement	121 cu. in./1984 cc	232 cu. in./3804 cc
Bore and stroke	3.41 x 3.32 in.	3.75 x 3.50 in.
Compression ratio	8.1:1	8.0:1
Bhp @ rpm	80 @ 5000	90 @ 3050
Torque @ rpm	105 @ 2800	163 @ 2200
Engine weight (approx.)	295 lbs.	495 lbs.
Carburetor	2-bbl.	1-bbl.
Car curb weight	2550 lbs.	2761 lbs.

Note: External and internal car dimensions are identical for all Gremlins, whether powered by the Four or the Six.

PM OWNERS REPORT: OLDSMOBILE CUTLASS

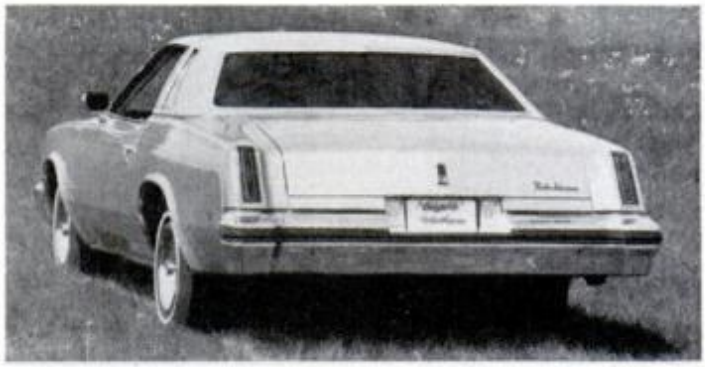
Why did owners make Cutlass Detroit's 1976 best seller?

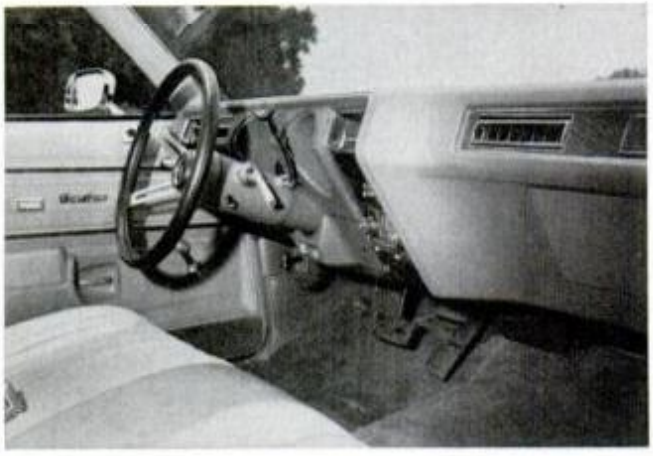
A nationwide survey based on 940,928 owner-driven miles

by Michael Lamm WEST COAST EDITOR

Photos by the author

Note: The Cutlass you see in these photos is a 1977 model, while our survey comprises owners of 1976 Cutlasses who bought their cars last July. Since the car, a red-hot seller last year, is but little changed for '77, PM believes that there should be considerable interest in what these owners have to say about their cars.





Sporty looks of the Cutlass and owners' good experience with previous Oldses account greatly for car's success. But short rear deck cuts trunk volume and rear-seat legroom—a concession to styling. Most owners opted for 350-c.i.d. V8 and praised its miserliness with gas. Cutlass S spans same wheelbase as downsized 1977 Delta 88.

Материал, защищенный авторским правом

Oldsmobile surprised even itself by making the Cutlass 1976's best-selling single model. The 1977 model is little changed from '76 and the Cutlass phenomenon is expected to continue.

Why Cutlass? What's so great about this car? For the answer, we went to the owners of 1976 models, asking them specifically what tipped the scale in favor of Cutlass. We also asked what they like best and least about their cars: how they rate such things as workmanship, dealer service, reliability, handling and comfort.

The primary sales appeal turned out to be —not surprisingly—**styling**. Raves a New York teamster boss: "I like the sleek lines of the Cutlass, which make it look like a sports car while having the comfort of a luxury car."

Styling still accounts for more car sales in this country than any other factor.

An Illinois stock clerk echoes: "Its styling is excellent; makes me feel good to just sit in it and have people stare at me."

"I've always liked Olds," agrees a New York highway worker, "and the '76 model is beautiful. Too, **Oldses don't rust** as fast as other makes of cars." And an Illinois mathematician: "I looked at all the 1976 cars and liked the Cutlass's looks best; also found it best for my needs." All told, 52.6 percent of Cutlass owners listed styling as their No. 1 reason for buying. Then fully 61.4 percent ranked styling as the outstanding and best-liked feature of the Cutlass.

Olds pioneered the use of plastic fender inner liners.

Another powerful buying incentive turned out to be riding quality. According to a Georgia military man, "I've had many compliments from passengers about my Cutlass's ride." A West Virginia engineer: "Quiet, smooth ride; I'm not tired after long trips." An Indiana computer programmer: "This Cutlass rides very smoothly and is practically noiseless at all speeds."

Ride and handling, however, sometimes work against each other. Several of the owners mentioned that the Cutlass tends to feel "jiggly" on rough roads. Comments a Florida marine biologist: "Comfortable, quiet ride on smooth surfaces and interstates, but slightly difficult to control on gravel or washboard roads."

Besides high-speed cornering, owners like the Cutlass's ease of handling in traffic and in parking spots.

Even so, owners **praised handling** in general. "Nice ride," says an Arizona plumber, "and my Cutlass Salon with the extra suspension doesn't wallow around corners like most cars in this class." A South Carolina salesman notes that even without the optional heavy-duty suspension, "It doesn't sway in the curves and is a solid, sound automobile."

When we asked Cutlass owners to list specifically what they like best about their cars, we got—among others—the following replies.

"Drives like a dream. The Brougham seats are far superior in comfort to any others I've sat on. Really good detailing."—California housewife. A Texas farmer: "Great handling in heavy traffic; can see well out of car; good gas mileage."

A Colorado auto mechanic: "Quiet, smooth, good acceleration, good mileage, classic looks, handles well, solid car, good visibility." A Michigan cashier: "Makes me feel like I'm driving a much more expensive car." "Five-speed overdrive transmission is a dream!"—Montana student. "Cruise control makes long trips a pleasure."—Illinois consultant.

On the minus side, here are some listings of specific dislikes.

"It would be nice," writes a Michigan technician, "if the price could be lower." It's not real high, but I'd like it less expensive."

The rubber workers' strike in Akron had a lot of 1976 owners waiting for spares.

"I had a flat tire. **No spare.** A friend helped me out. Still no spare. It's been four months." —Michigan department manager. An Illinois machinist: "Rear legroom could be improved, and so could trunk space." And a Wisconsin beautician notes: "Cars should be inspected better at the factory. My time is just as valuable as the men who make the cars."

You have to realize that the short rear deck and long hood give the Cutlass its swoopy styling.

Comfort elicited praise in general, but 41.5 percent of the owners we surveyed rated the back seat *fair* to *poor*. In the same breath, they mentioned that there ought to be **more trunk space**. A Georgia sales manager made this observation: "There's not enough legroom in the back seat of this car, but I bought it for only two or three people to ride in at a time."

We asked Cutlass owners what changes

(Please turn to page 158)

Summary of 1976 Oldsmobile Cutlass Owners Reports*

Total Miles Driven	**940,928**
Average miles per gallon:	
260-c.i.d. V8	
In town (EPA, 16 automatic)	15.5
Long trips (EPA, 22 automatic)	19.8
350-c.i.d. V8	
In town (EPA, 15 automatic)	14.5
Long trips (EPA, 22 automatic)	18.4
Series:	
Cutlass S	13.5%
Cutlass Supreme	51.4
Cutlass Salon	12.5
Cutlass Supreme Brougham	21.2
Cutlass Station Wagon	1.4
Engines:	
250-c.i.d. Six	0.5%
260-c.i.d. V8	12.0
350-c.i.d. V8	85.1
455-c.i.d. V8	2.4
Transmissions:	
Automatic	95.6%
Five-speed manual	2.4
Three-speed manual	1.9
Why did you choose Cutlass?	
Styling	52.6%
Past experience	25.4
Riding qualities	10.0
Reliability	9.6
Comfort	8.6
Specific likes:	
Styling	61.4%
Riding qualities	42.1
Handling	36.0
Comfort	35.5
Economy	23.9
Specific dislikes:	
Hasty workmanship	10.9%
Not enough trunk space	8.9
Rattles	7.3
Too little rear legroom	6.3
What changes would you like?	
More trunk space	13.3%
More rear legroom	8.3
Reshape front seats	5.5
Exterior styling details	5.0
Dealer service opinion:	
Excellent	21.3%
Good	36.0
Average	19.1
Fair	12.4
Poor	11.2
Workmanship opinion:	
Excellent	31.8%
Good	42.7
Average	15.6
Fair	6.6
Poor	3.3
Comfort opinion (front seats):	
Excellent	53.1%
Very good	32.7
Good	11.8
Fair	2.4
Poor	0.0
Comfort opinion (rear seats):	
Excellent	9.7%
Very Good	21.0
Good	27.8
Fair	21.0
Poor	20.5
Number of vehicles owned:	
Cutlass only	39.6%
Two cars	46.2
Three cars	8.5
Four cars	4.7
Five or more cars	0.9
Makes of other cars owned:	
Oldsmobile	31.3%
Chevrolet	22.7
Pontiac	10.9
Ford	10.2
Volkswagen	7.8
Had any mechanical trouble?	
No	61.2%
Yes	38.8
What type of trouble?	
Carburetor	24.7%
Transmission	19.8
Electrical	16.0
Did you fix it yourself?	
No	95.1%
Yes	4.9
Dealer repairs satisfactory?	
Yes	58.6%
No	41.4
Age distribution of owners:	
15-29 years	34.8%
30-49 years	37.7
50-plus	27.5
Would you buy another Cutlass?	
Yes	88.8%
No	11.2

*Percentages might not equal 100% due to rounding or insufficient data.

Материал, защищенный авторским правом

BOATING '77

11 that

More metal-flakes for the finish and more muscle for the engine, plus better safety procedures and performance standards are featured in this year's new boats

by Bill McKeown BOATING EDITOR

New designs, performance, construction materials, styling, outfitting and powering make up the hot news in pleasure boats this year.

Prices and values have both gone up. Below the waterline, improved designs are making for smoother riding. Refinements aboard provide more comfort and convenience.

Fiberglass is the league leader for midsize mass-production boats. Aluminum is a favorite for skiffs and rental rigs that must stand up to considerable hard treatment. ABS and other plastics have proved very successful when used by companies that can handle the necessary production methods.

Wood still is the choice for many custom-built craft, and is well-suited for the kit and backyard builder, or any boatman adding built-in compartments.

For adventure

Rough-water runs are becoming a popular new sport and a number of new craft for white water are the result. Best for bouncing a group through rocky rapids are the chubby inflatables. These must be made of rugged material to resist abrasion and punctures; inexpensive pool-toy-type vinyl won't do—and is dangerous. A good inflatable boat costs as much as one that is rigidly built, but is often more versatile.

Fiberglass kayaks and canoes of aluminum and various plastics are surf-riding and sluicing down many mountain streams. Shown here is one of three new models from Coleman, made of a plastic called Ram-X and reported to have superior abrasion resistance. They come in 13, 15 and 17-foot lengths.

For sailors

Sailcraft are getting longer without getting wider. Chrysler's new Herreshoff 26 sticks with the 8-foot beam that makes trailering possible without a special permit; it's built in both keel-centerboard and fixed-keel models. Other sailboat builders are also inching up past the mid-20s in overall length. Even sleek catamarans, like the Stiletto we selected from Force Engineering in Sarasota, Fla., has a broad 14-foot beam to support its 27-foot length, but can compress in width to ½ inch under 8 feet with a clever midship telescoping arrangement for trailering.

Chrysler's new 26 is designed to be trailered, has 6-foot headroom, sleeps six in vee berths forward, two side berths and a double under the cockpit.

For fishermen

Anything from an inner tube up to an ocean-going yacht can be the right size for an ardent angler, but some are better than others for boating fish. This year the bass boat is back with more styling and accessories, upholstery inside and metal-flake finish outside. One trend is toward fishing craft slick enough to look like bow-rider runabouts with open foredecks, fancy enough for family boating with the pedestal fishing chairs lifted out, and fast enough for water skiing.

For fishermen who insist on over-powering their craft, there are now models that can take the big 175 and 200-hp outboards or mount big-muscle sterndrive inboards. Excessive speed is now safer, though no more sensible, for fishermen racing out to a favorite lunker hole.

Offshore models continue to offer healthy high freeboard to keep the waves out, plus deep-V hull design to ride over them more smoothly. A center console for steering and engine controls allows anglers to move around the edge of the boat while fighting fish. Wellcraft and Grady-White have a passageway around a central cabin for the same purpose.

Except for outriggers and down-riggers, gunnels are kept clear so the fisherman will not foul his line while fighting a big one. New this year is the appearance of small

Материал, защищенный авторским правом

Canoes, new from Coleman (the camping gear manufacturer), are of Ram-X high-density polyethylene and come in 13, 15 and 17-foot lengths.

are tops afloat

For offshore, this Cobia cuddy-cabin fisherman mounts a small tuna tower and can handle a 200-hp Johnson motor.

Runabout performance and bowrider accommodations with open foredeck are built into yellow Steury (top) powered with 35 Evinrude outboard.

Newest from Glastron, the SSV 177 with sterndrive or outboard power introduces a constant-section vee hull for smooth yet stable running.

Hammond V-1950 El Dorado Elite at left, one of six Hammond models, comes with luxury accessories, silver or gold finish and hidden fold-down soft top.

Материал защищен авторским правом

BOATING '77

Stilleto, a trailerable 27-foot catamaran that claims speeds of over 22 mph, has double berth in each hull, streamlined cockpit canopy, bracket for 10-hp outboard.

tuna tower constructions on more 20-foot-and-up offshore fishermen. Some serve for spotting fish at a distance while others are rigged with remote controls and provide an elevated helm position for steering.

For family boating

The versatile runabout is still the choice for day boating, casual fishing, deep-water swimming and water skiing. New models for the coming season make these activities safer, more comfortable and more successful.

Many hulls now offer upright flotation that keeps a hull full of water afloat and upright as well so that passengers may be able to stay aboard and bail it out. More rugged construction, higher sides and added buoyancy also allow capacity for more people and gear in the boat and more power hung on the transom to push it.

Bottom designs that have been popular—deep-V (seakindly underway, tippy at rest) and flatter bottom (stable at rest, but a tendency to pound underway)—are now being combined by some builders. Glastron is introducing a new SSV hull that is reported to provide the smooth, softer ride of a deep-V and better stability at all speeds.

Many companies are adding transom platforms to make boarding from the water simpler and safer. Kevlar 49, which is a stronger, lighter but more expensive construction material, is being experimented with.

Refinements such as a windshield section that is lowered electrically into the deck is available from Cobalt Boats. Camper tops are turning pontoon craft and runabouts into cruisers. For a price, this year's skipper should find his ideal dreamboat. ★★★

Bowrider with bonus built-ins, Rally 190SS (left and above) from Mirro Marine Div. has side seats that convert to bunks, rear seat with wet bar under, convertible and canvas top hidden under rear upholstery.

Hydro Stream Vamp from Pipkorn Industries combines ski-boat look (at top) with open foredeck. It's rated for 140 hp and tops 43 mph when powered with 85 Merc shown.

Checkmate runabout (above), is another design combining hot ski-boat look with added seating space forward of the windshield. Power is new Evinrude 140.

Padded and posh, the MFG Gypsy Star 17 wraps the bowrider banquette seat in upholstery (left), has sunlounger seats in cockpit, swim ladder next to Merc 1/0.

Материал, защищенный авторским правом

BOATING '77

Best new gear for skippers

Add-ons that add the most to boats this year range from simple tarnishproof plastic cleats to pocket electronic calculators that can be programmed to do the arithmetic for celestial navigation. The SR-52 from Texas Instruments uses magnetic cards for 39 navigational programs and can help tell you where you are for about $350. For converting nautical miles to land miles and for other preprogrammed conversions, an $80 Sharp Electronics EL-8300 will supply answers.

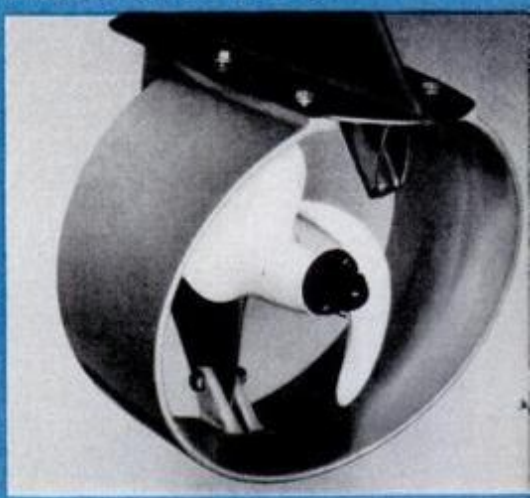
An example of a simple and much less expensive improvement is a nut and bolt from Mercury for mounting larger bolt-on outboards. The nut is rounded so that a special keyed socket is necessary to tighten or remove it—an excellent way to discourage a thief using an ordinary wrench. The stainless-steel bolts come in pairs and are called the Lock-Rite Security System.

Sterndrive users also have a couple new accessories available. Stern Step, from Raymac Industries, Homestead, Fla., provides permanently mounted boarding ladder steps bolted on top of the drive for easy reboarding (with the engine turned off). A small outboard motor mounting bracket can also be mounted on an outdrive for added trolling or auxiliary power. It's by P&D Enterprise, LaPorte, Ind.

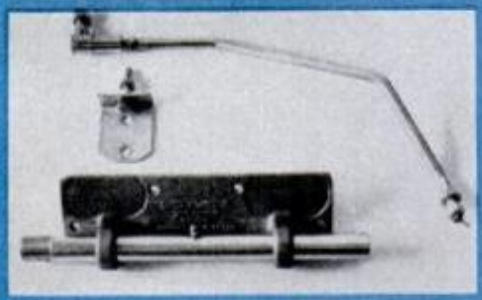
A system that is designed to scare away barnacles by mounting sound transmitters inside the hull is called Aqua Sonic Hull Tender. It comes from Aqua Sonic, San Jose, Calif., and reports are that buzzing or even rock music can be used, depending probably on what your local barnacles dislike the most. For sounds to warn of approaching bad weather, portable Storm Alarm Weatheralert radios can be set to be triggered by National Weather Service transmitters.—*Bill McKeown*

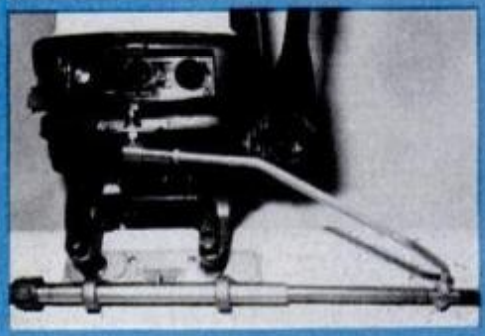
Clinometer/compass for binnacle or deck mounting tells where and at what angle: Goldberg's.

Propeller protector guard kit from Evinrude and Johnson dealers installs on outboards of 5½ to 25 hp.



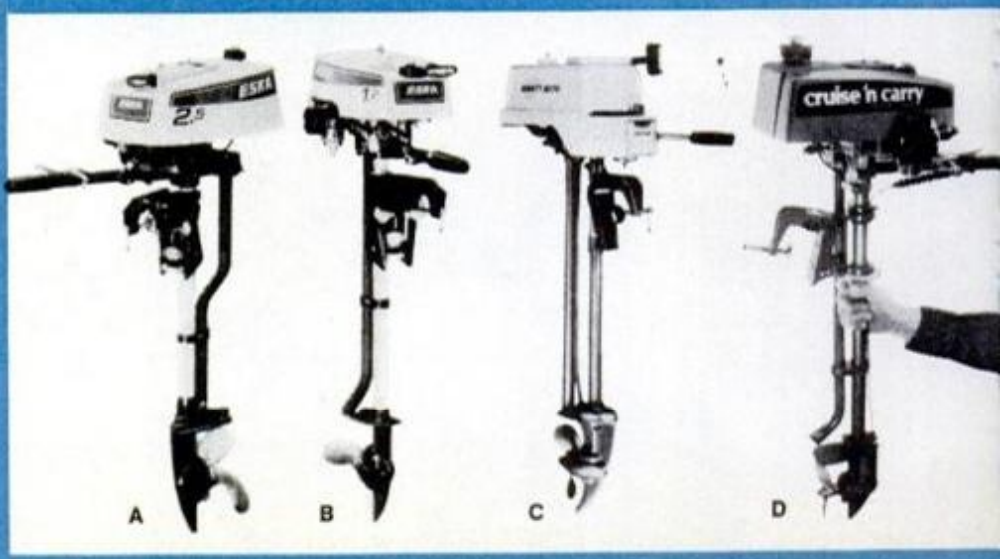
Less noise and more safety are claims for 3M Liquid Carpet coating that has sound-dampening and better traction features when painted in boats, canoes.





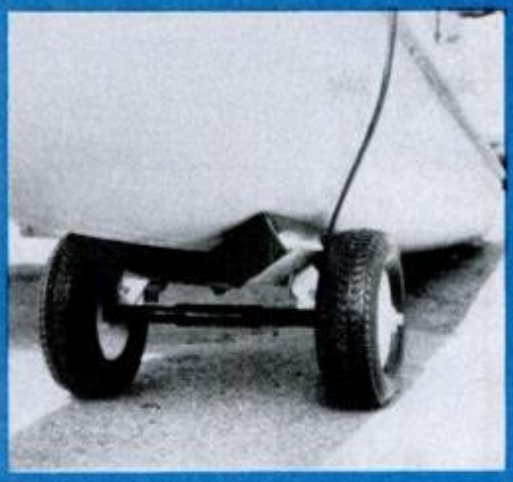
Remote steering for small outboards is possible with a mechanical steering attachment kit from Westwind Products, Denver. Disconnect when removing the motor is quick, and motor clamps hold bracket transom plate in place.

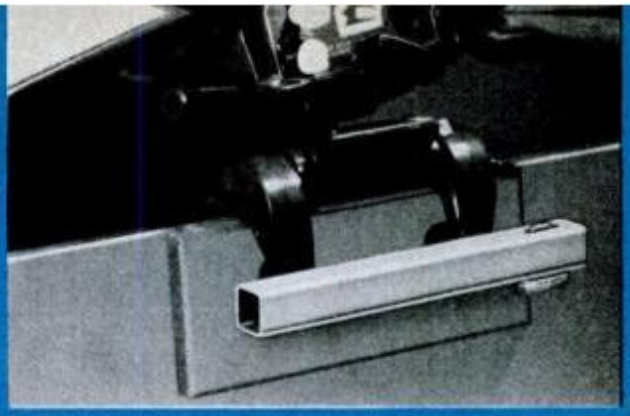
New mini-outboards offer extra push at less weight. Eska has eight gas models and two electrics, including 2.5 (A) and 1.2 (B) hp. Mighty Mite II (C) has 1.7 hp at 17½ pounds. Cruise 'n Carry (D) by HMC, Torrance, Calif., is 1.7 hp, 12 pounds.



Bilge pump designed for reliable muscle power mounts horizontally or vertically; OMC Parts.

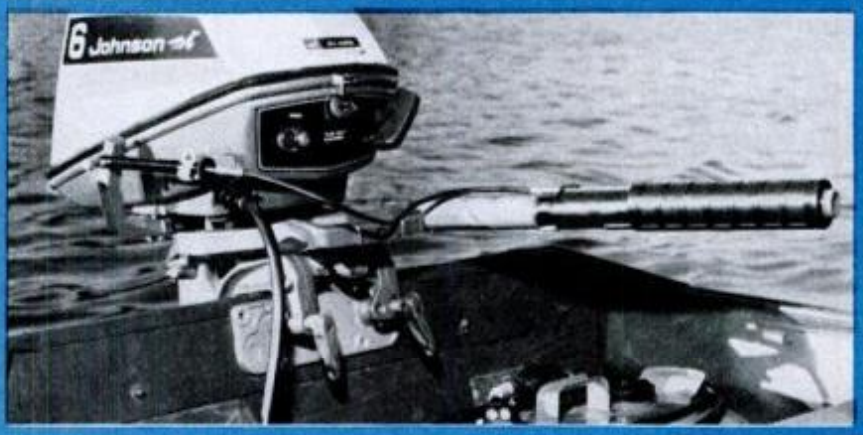
Kat Kaddy, one under each hull, can roll a 300-pound catamaran to launching site and into the water. Units are available from Gagne Associates.

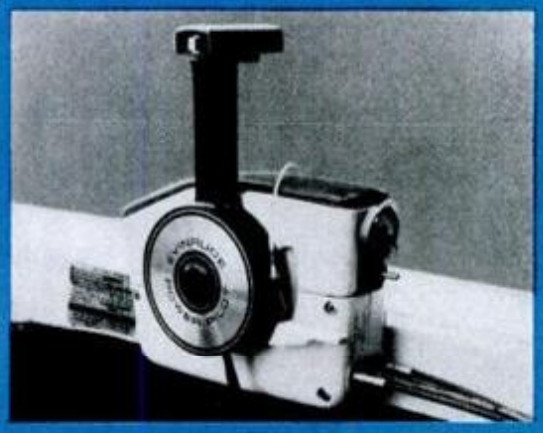




Outboard Motor Lock, made by the Master Lock Co., Milwaukee, slides over clamp handles of most motors and a recessed padlock prevents theft of your motor.

Tilt control in the palm of the hand is now available with a trim switch on the throttle of Johnsons and Evinrudes.





Remote reach is provided with extended grip that gives throttle and push-pull shift; by OMC Parts.

Autopilot convenience using saturable core compass with no moving parts, from Wesmar is set at helm or steered by hand control.

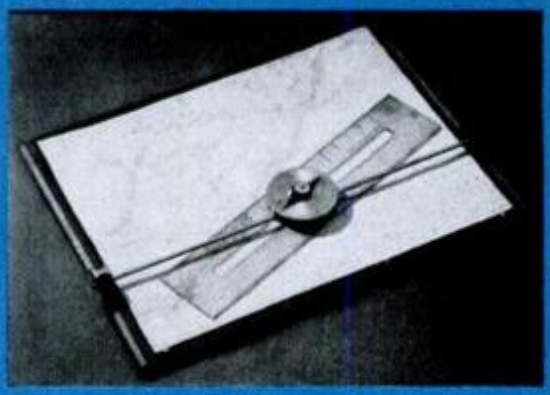
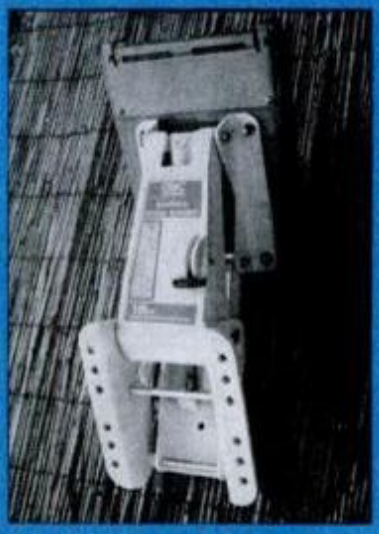


Chart reading in luxury is provided with the Ritchie portable chart table plotter that holds chart in place in cockpit or cabin, without any parallel rules or dividers necessary, to plot a course and navigate.

Trip-anchor, by Viking Products of Mercury Marine, has slide on shank that allows fouled anchor to be recoved backward.



An outboard can be added to almost any hull with the OMC Auxiliary Motor Bracket using spring loading to tilt up when motor is not in use.

A transom platform for smaller boats, the Folding Transom Deck by Bay Pattern Works is 13x24 inches, weighs 12 pounds.

"You're hitting about 120 miles an hour," my helmet radio announced after I'd reported my rpm reading to the chase boat. "Now let's see if you can give us a wave with one hand and come past close enough for a picture." I was busy noting trim angle, rpm readings, tilt and radio mike buttons on the steering wheel, but got up my courage for an instant—and waved.

How to take the world's outboard championship

PM's boating editor takes a 120-mph racing lesson from Team Mercury ace Reggie Fountain, world's fastest outboarder.

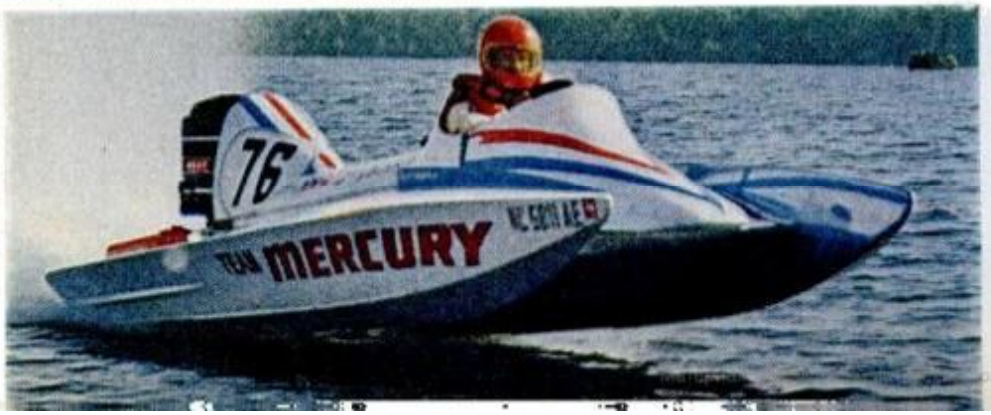
PM photos: Jim Schuenke

by Bill McKeown
BOATING EDITOR

"Suppose a *Popular Mechanics* reader wants your title—what's the secret?" I asked Reggie Fountain. "What would it take to beat you?"

Reginald Fountain Jr. of Tarboro, N. C., is the world titleholder of the Union of International Motorboating Class OZ—the test that allows as much power as you can get from an outboard motor. You race against the world's best drivers steering the world's fastest boats in the world's biggest league.

There are millions of outboard owners—over 7,649,000 in the United States alone—and almost every one would like to be the fastest. Last summer at St. Louis, Reg-



World Unlimited champion Reggie Fountain stands on deck of his 76 to check me out on starting sequence. At right, he hangs her high with trim cranked to plane on the edge with minimum wetted bottom surface for maximum speed. Today's power allows tunnel hulls to be designed with slightly less lift and more stability.

gie finished first in the OZ championship driving the souped-up XS Hi-Performance version of the Mercury Black Max 122-cu.-in. V6 outboard, pushing a Molinari tunnel hull.

"But how did you do it? How could our readers get 100-plus miles per hour out of their rigs if they wanted to try?" In an exclusive session for PM, Reggie not only explained—he even showed me. So here's the inside story.

Learning how

Starting early isn't everything, but it helps. Reggie got his first fast boat at 12 and began racing at 14. Summers were a chance to continue boat racing on the Pamlico River and Sound at Washington, N. C., but fall meant football halfback on the Tarboro High School team, and skeet championships while he was getting business and law degrees at the University of North Carolina. Once established in his own insurance business, however, Fountain bought the best twin-outboard tunnel rig he could find.

Soon Reggie was winning national races and joined the Glastron factory racing team in 1971. When Glastron gave up closed-course competition, Reg went back to winning as an independent until the Mercury factory team asked him to join. Now at 36 and still a winning member of that team, he is down three pounds from his high school halfback weight of 145, jogs several miles a day to stay in shape, runs his business, competes in races around the world, and has set seven world records and taken eight national titles. Keeping active, he admits, may be one of the secrets.

The machinery

While you can buy all the high-performance equipment from Merc dealers or the factory and edge out the factory drivers on occasion, it's not too likely. Team Mercury does so much testing and preparation work before an event, Reggie notes, that it can lead to a world championship. Before a big race, Gary Garbrecht, Merc's director of racing and high-performance products, may duplicate the course to be run in Phoenix, Miami, Dayton, Havasu, or Paris. He'll do this at Mercury's Oshkosh, Wis., northern test center. The drivers will try every possible combination of propellers, trim and setups, and an analysis will be made of what the competition is likely to run as well. If the decision is that it will take 130 mph to win, the rigs will be tuned to accomplish it.

At a recent event where exotic fuels were allowed, Garbrecht remembers he saw the competition accelerate out of turns with high roostertails of spray and reckless bursts of speed. His analysis: They were injecting quick jolts of laughing gas (nitrous oxide) into a nitromethanol fuel mix. The extra boost was a trade-off against engine life. Radio instructions went out to the Merc team to push the opposition, and the strategy worked as the competition motors blew before they could complete the race.

Radio is just one refinement that helps make today's winner. First citizen band and then special mobile units used by Indianapolis drivers were tested but did not give Mercury the reliable clarity desired. Finally, special frequencies and equipment were selected and thousands of dollars poured into this project. The result: a transceiver in each team boat, a microphone and earphone in each driver's helmet, and a rig ashore in the control van to let the race manager tell drivers when a pit stop is coming up, discuss threatening water conditions or overtaking boats, learn in advance of malfunction sounds and symptoms that may require a stop, and warn of accidents or obstructions ahead. Time and expense were approved by Merc president Jack Reichert and engineering vice president Charley Alexander because this gives what they demand of the racing program: success and safety.

The test

Because I had checked out in fast equipment before, Reggie let me try out his world-record boat to feel what speed over water can be like today. Team Mercury goes first class—an elegant tractor trailer with machine shop forward and ramp aft to roll out one or two raceboats aboard arrived at Whichard's Marina with No. 76, Fountain's *Spirit of '76*, for launching on Pamlico Sound near Tarboro.

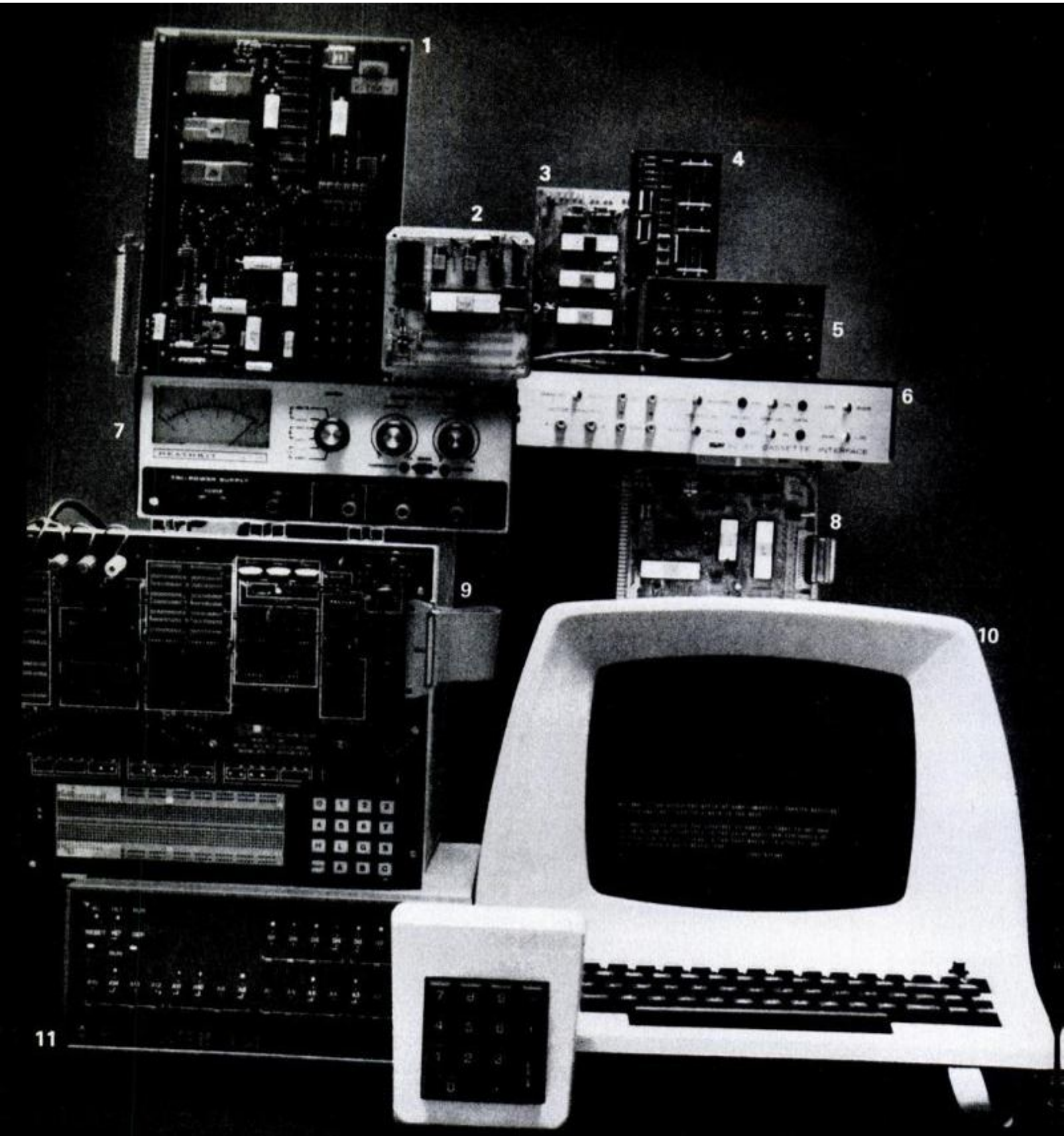
Reggie, Garbrecht and crew chief Jim Schuenke preflighted the craft carefully and then eased Reg into the water and headed him out, ready for fire-up. With a throaty roar and spray of propwash, 76 aimed offshore and we followed in Reg's Grady-White chase boat while talking to him with our walkie-talkie. Transmission was crisp as he opened up a long roostertail and pulled away from a photo plane overhead.

Back at the ramp, I buckled into my Gentex jacket, reviewed starting sequence with Reggie, and then flicked on boost and starter. Spray stung my face as I picked up speed, and I dropped the face shield and accelerated with less porpoising in the 40 to 80 mph range than I recalled in other tunnels. The boat mounts no speedometer—you're racing against competition, not dashboard gauges, Garbrecht astutely feels—and the one dial on the steering wheel is the tachometer. I held

(Please turn to page 128)

Speed seat in the cockpit (below) faces steering wheel with buttons, left and right, to trim out engine. Trimming in is controlled by a switch on left footrest, while under right foot is throttle. Center steering button opens helmet radio mike. Center dial on wheel is tachometer, and no speedometer is included to distract driver. Cord on seat is emergency kill lanyard to shut off engine if driver is thrown out of the boat. Fountain (top right) wears a protective plastic vest that fits under standard parachute-strapped life jacket like Gentex I'm buckling on. Special Team Mercury van, (lower right) holds machine shop plus one or two racing hulls that are off-loaded on trailer's down ramp.

Материал, защищенный авторским правом



Computer kits vary in size and nature. Shown here are: 1. KIM-1 computer with keyboard and display; 2. National Semiconductor SC/MP computer board; 3. Jolt computer board; 4. Oliver OP-80A tape reader; 5. Ro-Che controller for four cassette recorders; 6. Southwest Technical Products AC-30 cassette interface; 7. Heathkit IP-2718 tri-voltage power supply; 8. Intel SDK-80 computer board; 9. E&L Mini-Mic computer; 10. Lear-Siegler ADM-3a terminal with numerical keypad accessory; 11. MITS Altair 680 computer.

Материал, защищенный авторским правом

Home computer kits: The hottest new angle in America's newest hobby

A rundown on 16 kits, plus a report on building one.

by Ivan Berger ELECTRONICS EDITOR

The grin on my face, and the bags beneath my eyes had everyone thinking I'd been on a long round of late-night parties. But it was a six-week computer binge instead.

During those six weeks, I lost a lot of sleep, used a lot of solder, and totally changed my ideas about what home computer systems are like—and what they're good for.

They're not good just for working with numbers. Computers can do almost anything—provided you can figure out or find the programs that tell the computer how to do it.

For example, a computer can not only keep your address and telephone list up-to-date and alphabetical, but it can search through that list to identify the numbers that showed up on your long-distance telephone bill. It can keep track of who sent you Christmas cards for the last three years, and who you sent yours to.

Give it the mileage and gallons for every tank of gas you've fed your car, and it can tell you what mileage you got from the last tankful, what your mileage has been for the last thousand miles and how well that compares with what you got last year.

Sit an AM radio down next to it, and the computer can play tunes in pulses that the radio picks up.

Use it to reconcile your checkbook with your statement, and the computer can also tell you which checks haven't cleared, find when the check for a disputed bill did clear, and summarize deductible items.

Add some accessories, and it can draw pictures on a TV screen—even animated ones—in color. Other accessories let it keep track of the time and date (shifting automatically to and from daylight saving), accept and answer telephoned commands, even turn your furnace on and off.

So far, all my system's done is play games, because the programs I need for those are readily available. And I've already written some simple game programs myself.

As I learn more about programming (it's challenging, but not back-breaking to learn), I'll write my gas-mileage program, then my checkbook reconciler, then a full bookkeeping program—but not in time for this year's taxes. Shucks.

It's more fun and cheaper to build a kit than to buy a completed computer.

It's easier to learn programming when you have a computer at hand to test your programs as you write them, and show you your mistakes. But first you need to pick your system, because programs written for one computer won't necessarily run on one of a different type. Programs written in BASIC or other "high-level languages" (see glossary, page 162) are an exception: They can be modified to run on other computers which talk that language.

So the hardware of the system must come before the "software"—the programs. And as you can see from our photos, there's a staggering array of hardware from which to choose.

Making it a system

The computer itself is just part of a system—the part that handles all the logical manipulations and stores the data and the programs that tell it what manipulations are required. At a minimum, you'll also need a "terminal" with a typewriter-like keyboard that lets you communicate with the computer, and a

PM builds 16 kits and semikits that can:

- Monitor furnace fuel consumption
- Do family bookkeeping
- Do homework
- Check long-distance calls
- Keep a kitchen inventory
- Play games
- Balance your checkbook
- Design circuits
- Keep family nutrition records
- Index your record collection
- Keep your Christmas card list
- Check your gas mileage

And with a few more accessories, a computer can:

- Answer your telephone
- Guard your house
- Draw pictures
- Keep tax records
- Type your letters
- Keep your social calendar

Материал, защищенный авторским правом

TV screen or printer which shows what you've fed to the computer and how it answered you.

The memory inside a computer is limited (though you can add more, within limits), and it forgets everything when you turn the power off. So it's very handy to have a "bulk storage" device which can hold programs you're not using and feed them back into the computer when you need them again. It's also necessary to have a bit of Read-Only Memory (ROM) that doesn't go blank when the power is off. This bit holds the program that tells the computer how to start itself up again.

Computers are dumb

That program, called a "monitor" is most important. Computers don't know *anything* unless you tell them first: Not just when to come in from the rain, but also how. When you first turn a computer on, before you can run any useful program, you have to retrain it from scratch to accept a program from your terminal. That's a long, boring process, and one tiny error can wipe out all your work and force you to start over. The monitor—a "wake up and eat your program!" program—does it for you.

Bare boards

The computers themselves come in a wide range of forms and prices. The starkest are kits such as Intel's SDK-80 ($350), Microcomputer Associate's JOLT ($159), and National Semiconductor's $99 SC/MP —so small its parts come bubble-packed to one page of its loose-leaf manual.

These are bare boards, complete with computing circuitry, some memory, a monitor and an interface circuit for connection to a terminal, but without cabinets, built-in input or output devices, or the low-voltage d.c. power supplies they need. (JOLT does, however, offer a power supply for $99, and Heath's $80 IP-2718 will power almost any of these boards.)

MOS Technology's KIM-1 is a step up. Not actually a kit (though at $245 it's priced like one) it, too, needs a power supply. But it does have a calculator-like keyboard and display built in for input and output.

On second glance, though, you'll notice that the digits on the keyboard don't just go up to 9—they continue on through letters A to F. That's because the programs written for KIM-1, (and most other computers) are not written in decimal numbers but in hexadecimal ones

(Please turn to page 162)

I build my own home computer from a kit

by Anthony Curtis

The Altair 680 kit comes with 518 parts (left) that make a base computer (right) when they are all connected and soldered. Kit has easy step-by-step instructions.

The easy way to get your feet wet in hobby computers is to build a microprocessor from a kit, and that's just what I did. I got the $466 Altair 680 from MITS, one of the oldest manufacturers in the brand-new home-computer field. Now, some 518 integrated circuits, capacitors, resistors, switches, LEDs, transformers and what-have-you later, you can take it from me: The Altair 680 kit is easy to build.

I had wired Heathkits and other small electronics gadgets before so I had a little experience. It took me a total of 20 hours spread over two days to finish the computer. If you have not wired an electronic kit before, it might take you one to two weeks as you go slowly through MITS' step-by-step instructions.

The Altair 680 is tiny compared with some microprocessors on the market, yet it will house a memory as big as most and do just about anything others might offer. It is a complete device around which you can build a system to run anything you can imagine at your house plus several chores at the neighbor's next door.

The 680 is, however, only the heart of a usable system. You also need a teletypewriter or video-display terminal to allow you to give information and instructions to your computer and permit it to talk back to you.

When your 680 kit comes in the mail, you'll find two fiberglass printed-circuit boards with holes for parts already drilled. The boards have a hefty feel and a commercial-grade look. Copper is plated on both sides and holes are plated through so you only have to solder one side, a mark of quality design. Each board has parts locations clearly marked in silk-screened symbols.

Also in the mailing carton will be three fat plastic bags of small parts, a 2-inch-thick ring binder of instructions, and a solid blue-and-gray box to house the completed computer. Everything counted out just right; no parts were lost in shipping.

Few tools needed

The only tools you need to build this kit are needle-nose pliers, diagonal cutters, standard-blade screwdriver, a Phillips screwdriver and a soldering gun of 25 to 30 watts. I recommend the Ungar 776 with tip number 7155. Similar good irons will do as well.

MITS' assembly instructions are as easy to understand as those provided by Heath with its famous kits. Pictorial diagrams show you which part to mount next and where to mount it. There is a full explanation of how to solder to the printed circuit boards, and mechanical mounting instructions are good. Whether you are a beginner or not, take it slow and easy. There are some dangerous pitfalls to be avoided: Don't use irons of more than 25-30 watts. Higher-power irons or guns will lift the copper "lands" right off the boards and burn out delicate parts.

Be extra careful to heat an individual connection only long enough to get the minimum amount of solder to flow around it. Circuit lines printed

(Please turn to page 163)

Fit out for making money

by Hank Lake

Ever think of lowering the coil of your metal detector down into the water on a long extension cord so you can look for sunken treasure? As soon as the idea occurred to me two years ago I looked around for an old boat and bought her off-season for $150.

She was a fine old wooden 23-foot Chris-Craft with an inboard engine. The cabin had already been removed and the boat used as an open fishing craft. In the spring I overhauled her, and changed her name from *Leaking Lena* to *Sand Pebble*.

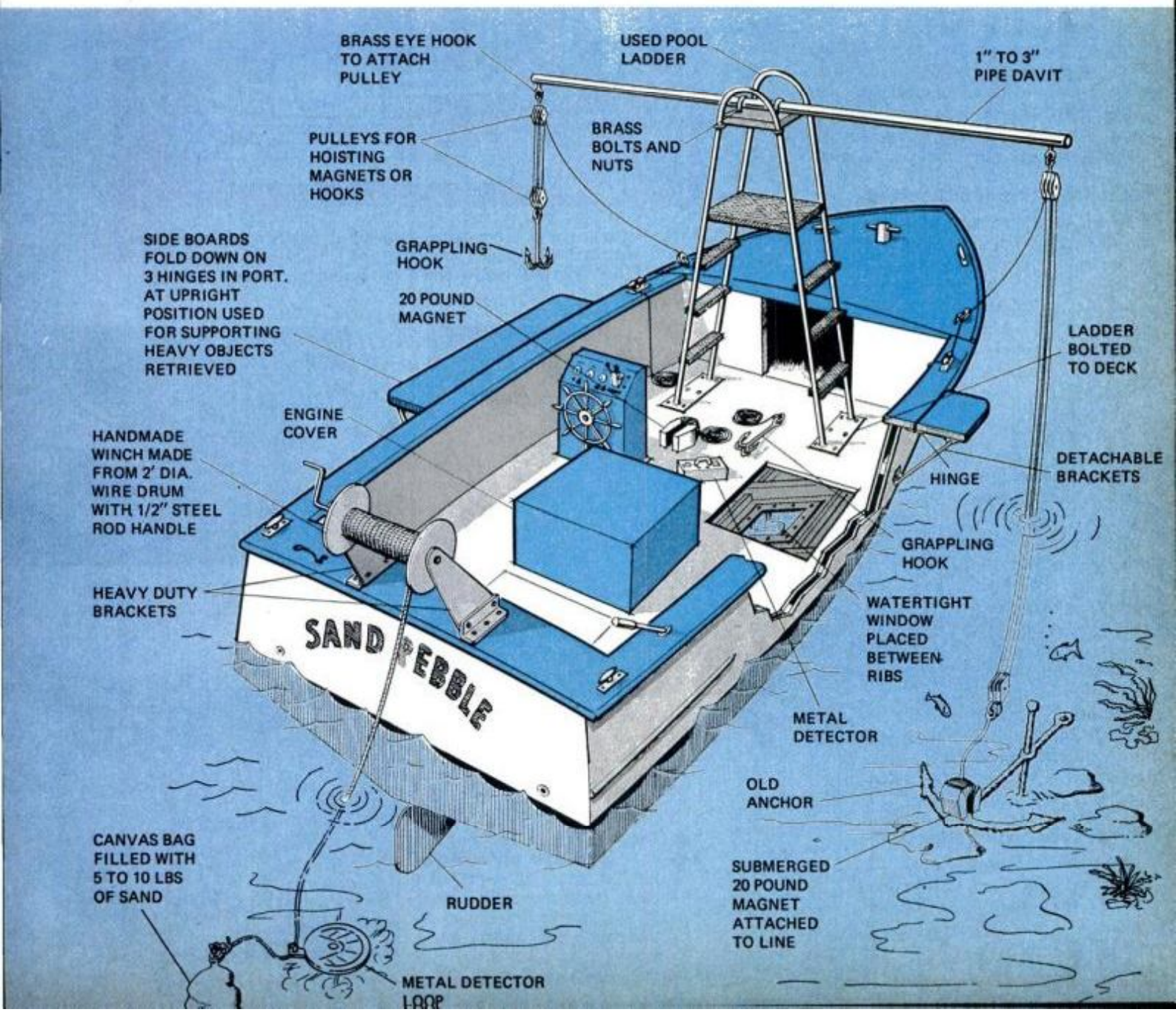
To outfit her for salvage, I bought an old pool ladder, painted it with red lead to prevent rust, and then rigged a length of two-inch pipe across the top of the ladder so the pipe would extend two feet out from each side of the boat. Connected to each end of the pipe was an Archer one-ton hoist with a 7:1 lift ratio.

I purchased two 20-pound surplus Navy magnets for $20 each and secured them to the hoists. Where the magnets would be lowered, I sewed old canvas tarp around rolls of scrap Styrofoam and fastened them in place as fenders to protect the boat sides when I was hoisting salvage.

For my White's metal detector, I mounted a wire spool rigged with a crank handle to raise and lower the detector's loop coil, wrapped in heavy plastic to protect it and weighted down with a ballast bag of 5 to 10 pounds of sand. Additional equipment included grappling hooks for snagging outboard motors, anchors and nonmagnetic bronze fittings.

Working the waters along the coast of Staten Island, N.J., and New Jersey, I would drift and check the snag-infested shallows around old piers with the magnets, using the detector off sandy beaches. So far I've raised propellers, shafts, heavy brass fittings, tool and tackle boxes with watches, coins and rings in them, ships' wheels and a great variety of fishing equipment that can be sold to marine stores and flea market dealers. An interesting source for sunken treasure is the *Descriptive List of Treasure Maps in the Library of Congress*, 45 cents from the Government Printing Office, Washington, D.C.

My total cost for boat and equipment was $347. In just one month I earned more than that. ★★★



How to stop hesitation

Stumble, flat spots and misfiring can drive you crazy. Here's how to get the response back in your engine.

by Mort Schultz

Stumbles, flat spots and misfirings on acceleration—those are signs of hesitation. They occur when an engine doesn't respond promptly to your command to accelerate either from a stopped position or while rolling. Instead of accelerating smoothly, the engine falters—like it's pausing to catch its breath—before picking up the pace.

Many people who write *Car Clinic* complain that professional mechanics are sloughing off hesitation problems with the excuse that they're being caused by emission control equipment and nothing can be done.

Most problems easily solved

Well, most cases of hesitation are easily cured by making a minor adjustment or replacing a relatively inexpensive part. Only sometimes is a solution difficult, and that's when a particular model car has a built-in hangup. In nearly all these instances, however, manufacturers issue technical service bulletins giving repair procedures.

For example, some 1975 Ford Mavericks and Granadas, and Mercury Comets and Monarchs with 200-cu.-in. engines built between Feb. 25 and March 12, 1975, were outfitted with an incorrect exhaust gas recirculation (EGR) venturi vacuum amplifier. The improper component increases EGR flow, resulting in hesitation. The solution, given in a service bulletin, is to replace the venturi vacuum amplifier.

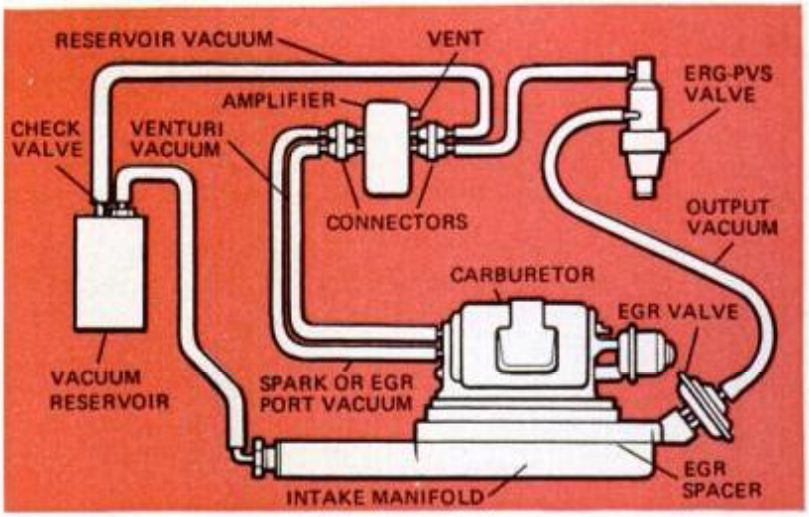
Inherent problems such as this are the hardest to solve because you and independent mechanics don't have access to service bulletin information.

Check service bulletins first

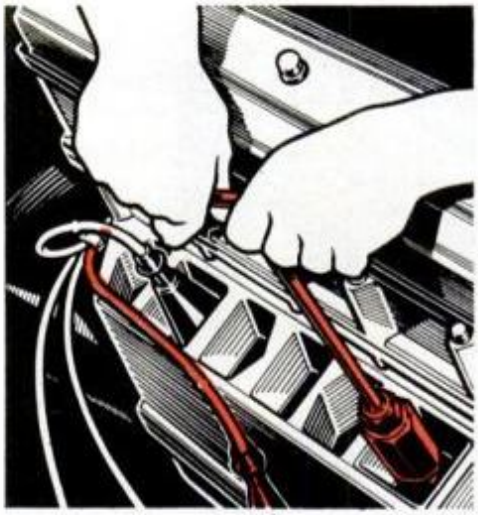
Dealer mechanics have data on hand, but not all of them consult the files as they should.

There are two ways to light a candle if you're in the dark over a hesitation problem which may have

PM art: Peter Trojan

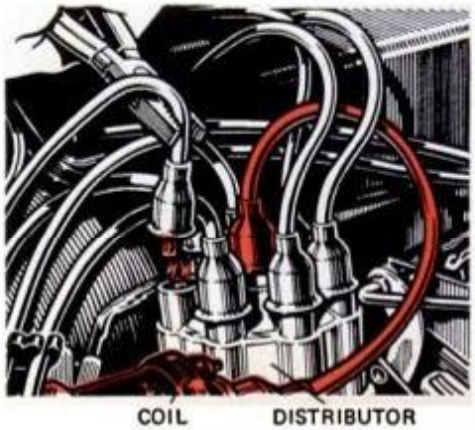


1 **First step** to solve a hesitation problem is checking manufacturer's service bulletins to see if your car has a built-in defect—some '75 Fords, for example, had wrong EGR system amplifier installed.



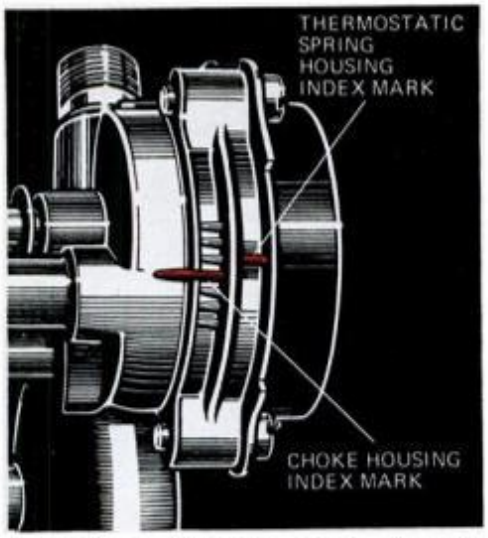
2 **Pull your sparkplugs** and check that the electrodes are clean, and the porcelain insulators are not cracked.

3 **Check sparkplug gap,** making sure it is set to spec with the right type of gapping tool as one shown above.



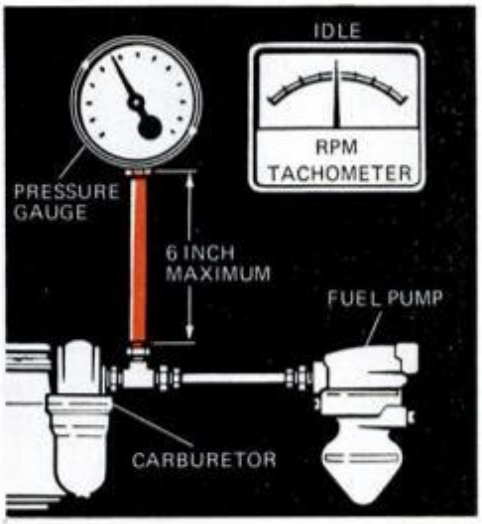
4 **Test ignition** by pulling any sparkplug cable from the distributor cap. With insulated pliers, hold the cable about ¼ in. from the terminal in the cap; you should get a strong, blue spark when you crank the engine.

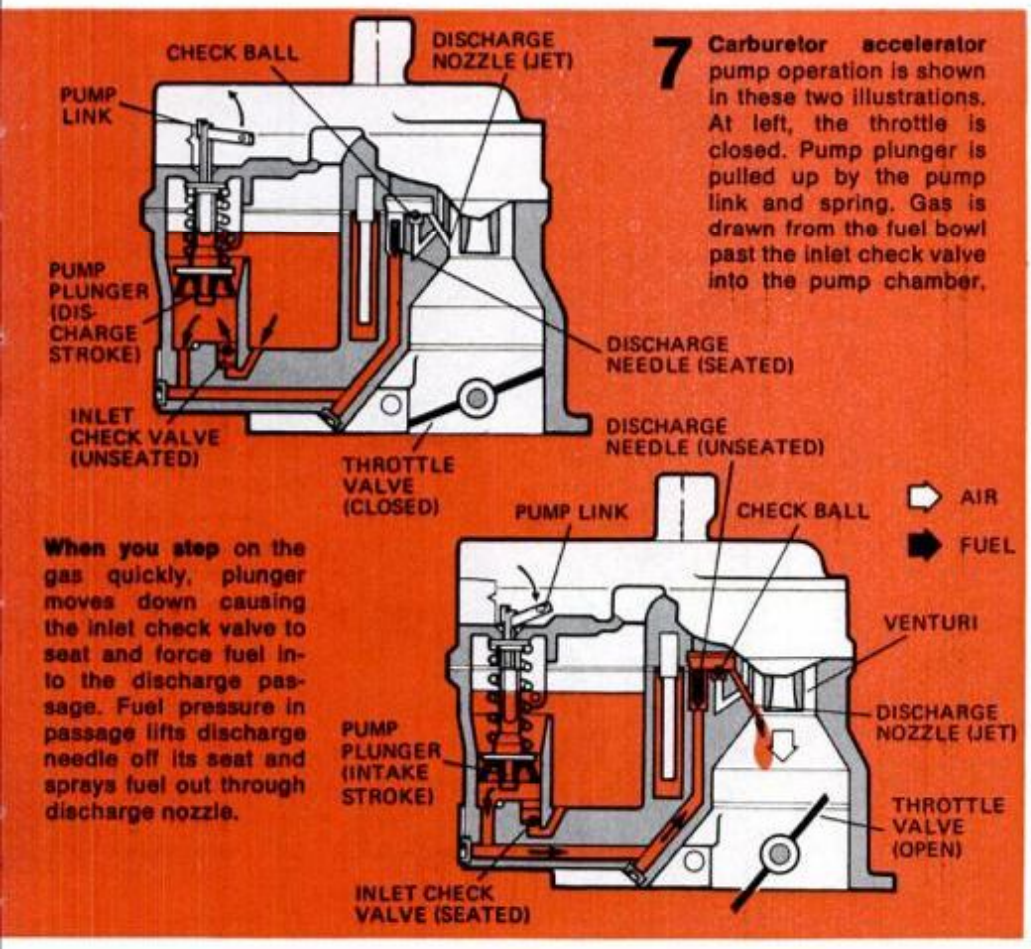
Материал, защищенный авторским правом



5 **Typical automatic choke** is carb-mounted, marked for rich/lean. Going one mark rich may stop hesitation.

6 **Check fuel pump** as possible culprit with setup shown above. Fuel pump specs correspond to curb idle speed.

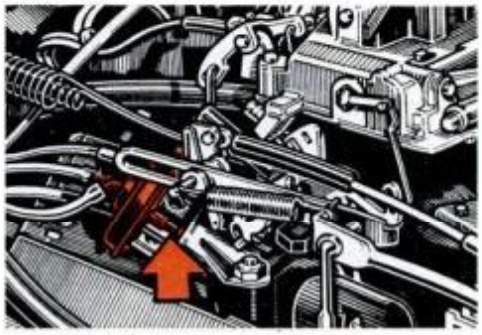




7 **Carburetor accelerator** pump operation is shown in these two illustrations. At left, the throttle is closed. Pump plunger is pulled up by the pump link and spring. Gas is drawn from the fuel bowl past the inlet check valve into the pump chamber.

When you step on the gas quickly, plunger moves down causing the inlet check valve to seat and force fuel into the discharge passage. Fuel pressure in passage lifts discharge needle off its seat and sprays fuel out through discharge nozzle.

8 **Engine problems** can cause hesitation so test compression and refer to the diagnosis procedures in the text.



9 **Exhaust gas** recirculation valve (arrow), usually located close to carb, could be culprit. See test in text.

been built into your car. First, consult the service department of a dealership. Ask the man in charge to check his index of service bulletins to determine if a bulletin has been issued by the manufacturer covering your circumstances.

If the service department can't or won't help, write the *service division* of the particular carmaker. Provide a full description of your car and ask if there is a service bulletin concerning hesitation.

Now start troubleshooting

Once you find out that hesitation isn't the result of a manufacturing error, the job of uncovering the cause becomes a matter of intelligent troubleshooting.

There are 20 or so different reasons, but practically all can be pinpointed by four checks:

- Check sparkplugs and cables.
- Test ignition output.
- Check fuel supply.
- Test compression.

Sparkplugs and cables

Examine cables and boots for dryness and cracks. You may be losing current before it reaches the sparkplugs. An accurate test for leakage is done with a jumper test wire that has alligator clips fastened at both ends and a screwdriver. Fasten one clip to ground, and attach the other to the screwdriver.

Remove one cable from a sparkplug, and point its boot up in the air so it isn't near a ground. Let the engine idle and probe the length of the cable with the screwdriver tip.

If the cable is leaking, spark will jump from the cable to the screwdriver. Check all cables this way.

However, don't do this test if the engine is equipped with electronic ignition. Once electronic ignition is examined visually, further testing requires special equipment.

Check that sparkplugs are in good condition and make sure electrode gap is set to the specification printed on the tune-up decal glued somewhere in the engine compartment. A gap wider than specified is a chief cause of hesitation.

Ignition output

The bad guy you're looking for is a weak coil—sometimes difficult to uncover, because a coil often doesn't break down until it gets hot. Suspect the coil if hesitation doesn't occur until the engine is warm.

First test the coil with the engine cold by removing the cable from the No. 1 sparkplug and inserting a screwdriver with an insulated handle in the boot, so the tip contacts

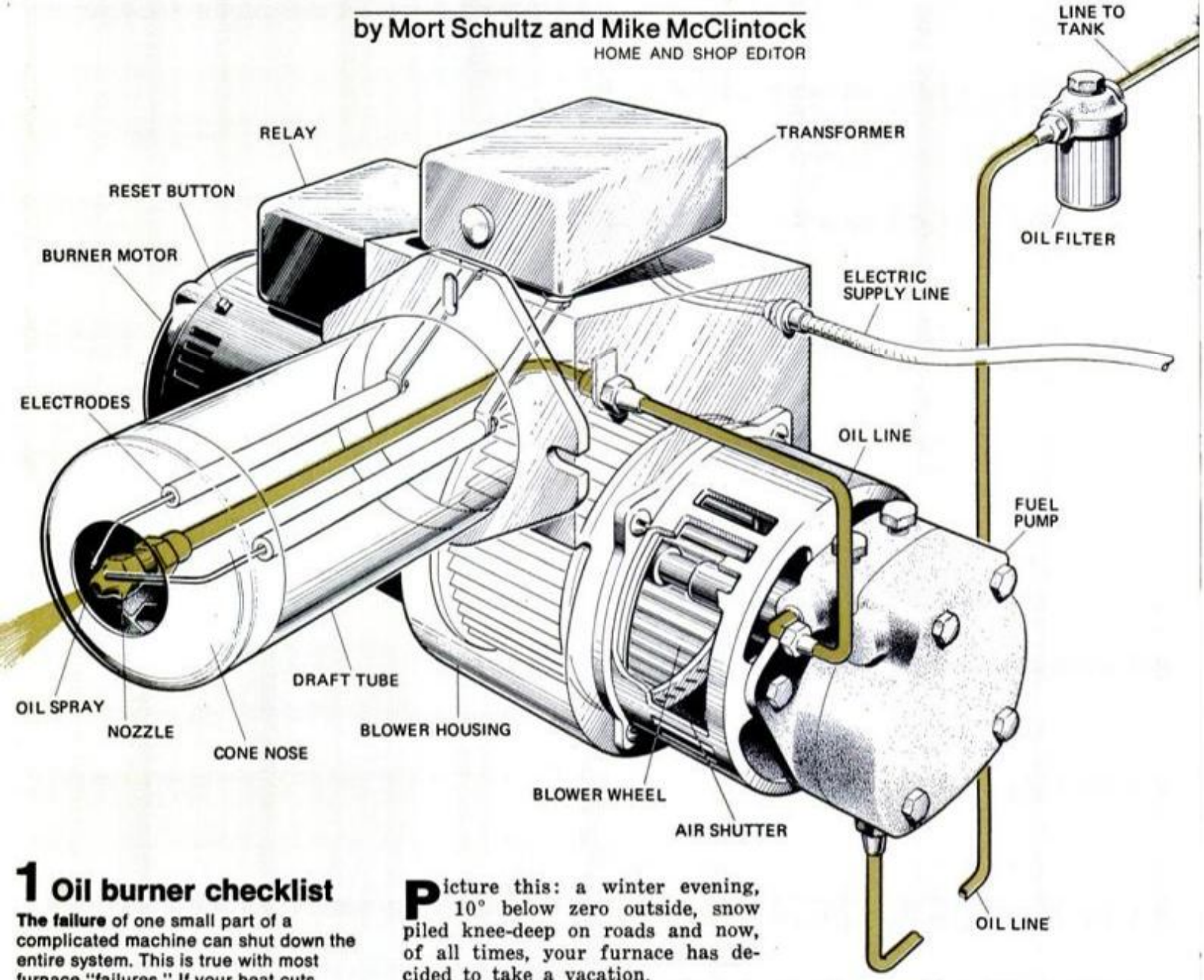
(Please turn to page 148)

Материал, защищенный авторским правом

Furnace fix-ups that save fuel and money

Most furnace failures are caused by minor problems that are easily corrected. If your furnace conks out unexpectedly, this checklist could save you a cold night and a service call.

by Mort Schultz and Mike McClintock
HOME AND SHOP EDITOR



1 Oil burner checklist

The failure of one small part of a complicated machine can shut down the entire system. This is true with most furnace "failures." If your heat cuts off, chances are the cause is one of the culprits here or on the following pages: no oil in the tank, in-line oil filter clogged, thermostat accidently set too low, dirty contact points on an older thermostat, an emergency switch away from the furnace mistaken for a light switch and turned off accidentally.

Picture this: a winter evening, 10° below zero outside, snow piled knee-deep on roads and now, of all times, your furnace has decided to take a vacation.

The temperature in the house is nosediving several degrees every few minutes, and you know deep down inside, without having to make any calls, that there isn't a serviceman in the area who can come to your rescue.

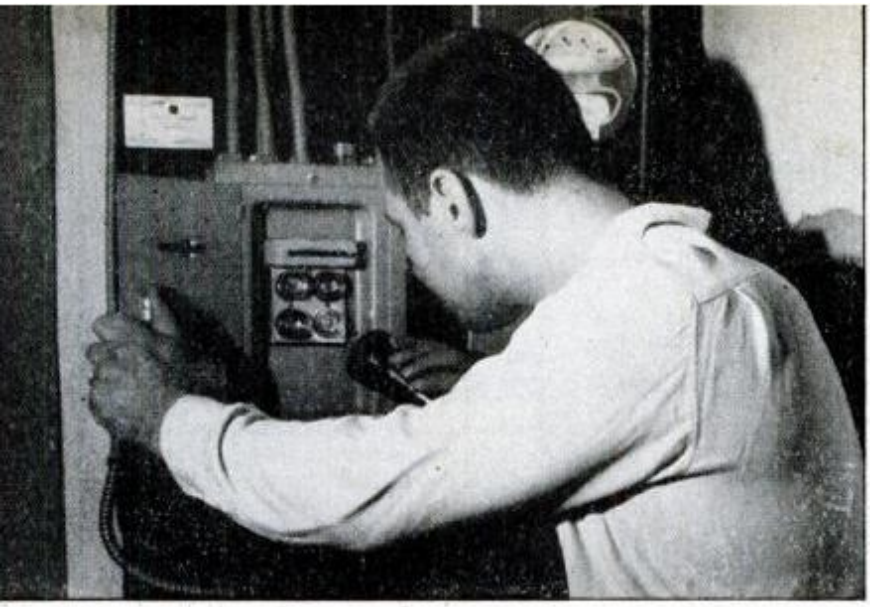
Don't hit the panic button. Take the positive approach and try to get your furnace to deliver some heat again. Most furnace breakdowns result from minor problems. Maybe your solution won't be permanent, but it may suffice until a serviceman can get to your home.

Get your facts straight

Think a minute: Has the furnace really shut down or is the delivery system on the blink? It's easy enough to find out.

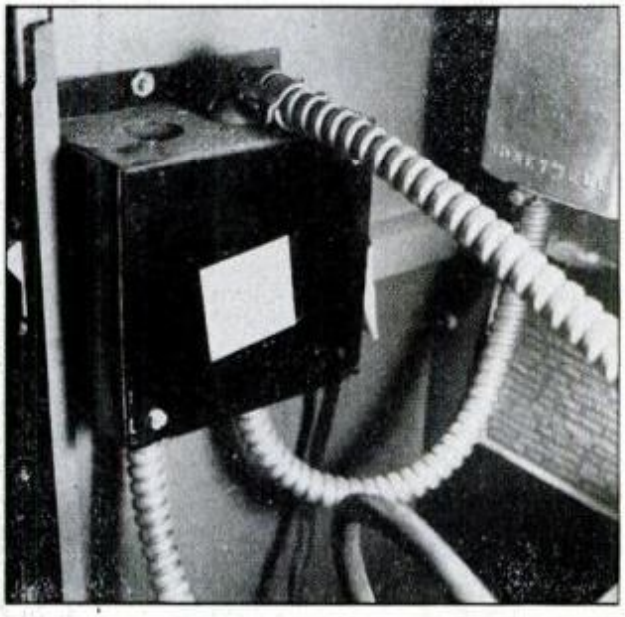
Shove the thermostat up high and check the furnace. If it is firing, then the reason for the lowered temperature is an inoperative heat delivery system. This is the system

Материал, защищенный авторским правом



2 Fuse box check

Don't rely on a visual check of the fuse. Try turning it to see if it has come loose, and try replacing it. If you have a circuit breaker, see if it is tripped and reset it firmly. If it trips again, don't press the issue. Always have spare fuses.



3 Electrical field connections

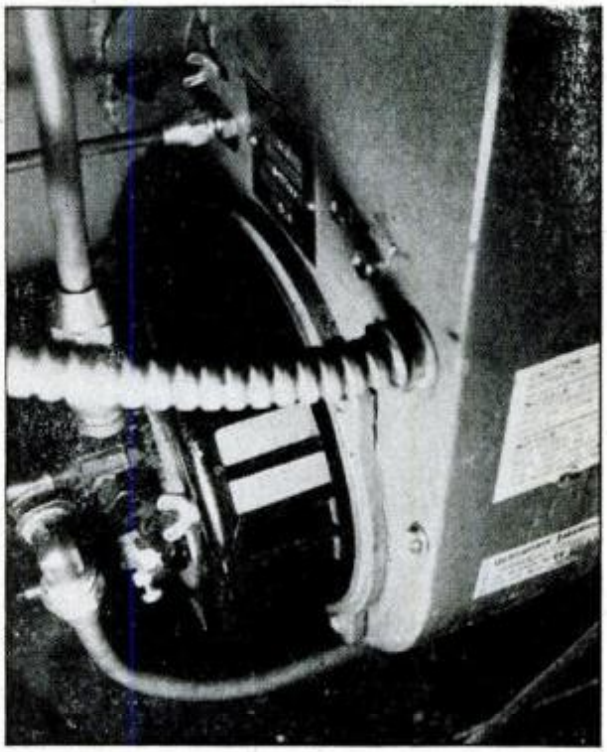
Many furnaces are equipped with a junction box that houses field connections between the supply, motor and fan controls. Turn off the current to the unit, remove the cover plate and make sure that the connections inside are secure. Vibration of an oil burner motor can cause wire nuts to loosen.

—forced air, steam or hot water—that transfers heat from the furnace firebox to your living quarters.

If there is a problem with the delivery system, some heat will get to the living quarters in most cases, if only by gravity. You can, however, do some things in an attempt to increase heat flow. For example, if you have a forced hot-air system, be sure all filters are clean. If the blower motor works by drive belt (it's a good idea to keep a spare belt on hand), see that the belt is not broken. If the blower motor is not working at all, shut off its switch

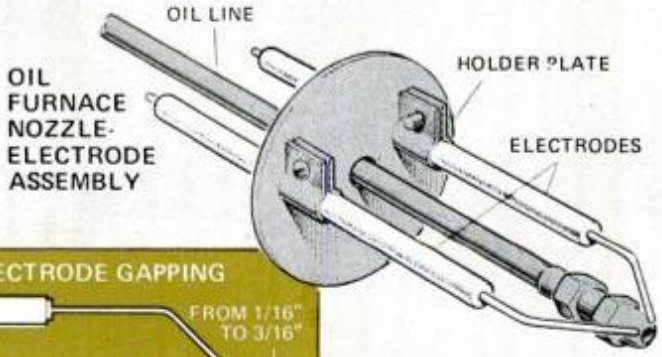
4 Oil pump problems

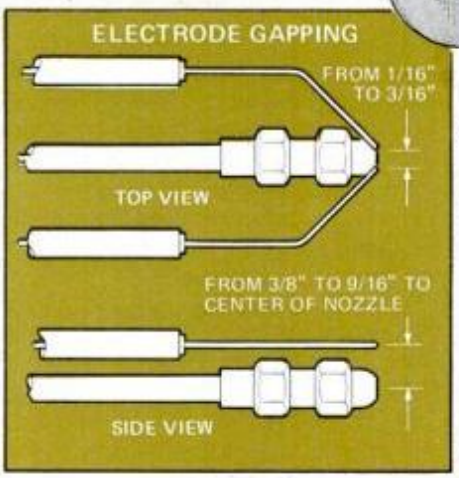
Make sure the cutoff valve in the oil line is open. With a one-line system, it is possible for pump to become air-bound. You can relieve this by bleeding the line at bleed valve until air bubbles disappear.



5 Reset switches

Most oil burners have two safety switches; one to protect the motor from overload and one to shut down the oil pump if the spray doesn't ignite. Press the motor reset first. If the motor does not start, activate the stack control relay once. If the furnace won't ignite after you've reset these switches once, don't keep pushing them.





6 Nozzle, electrodes

Follow the procedure listed under "nozzle-electrode assembly inspection" to detach spray nozzle and wash it in warm water. Blowing air through the opening will help remove clogged debris. You can try to clear a blockage with a thin strand of wire, but make sure that you don't damage or enlarge the nozzle opening. Standard electrode gap settings are shown in the diagram at left.

Материал, защищенный авторским правом

7 Clogged filters

Although clogged filters probably won't shut down your furnace, they could make you think something is wrong with the delivery system. It pays to keep an extra drive belt on hand for the blower motor in case the belt breaks. If the motor itself should conk out, you can increase the gravity heat flow temporarily by removing the filters.

8 Air bleeding

If you have a hot-water system and radiators, an air-locked unit could be keeping heat out of some rooms. You can test for this by opening the bleed valve on the radiator, allowing air to escape until water appears. Hot water circulators, usually installed near the furnace, can bind up if they aren't lubricated. Check the manufacturer's directions.

9 Servicing

Professional servicing is the best way to prevent mid-winter freeze-ups. Check your utility or oil company now to find out if there are any exotic devices in your system, like a photoelectric cell, that need special attention or parts.

10 Cleaning

Here are some of the spots where dirt build-up can cause problems: in-line oil filter, spray nozzle, thermostat contacts, electrode tips and on some units the photoelectric cell cover.

and remove all the filters temporarily to increase the gravity heat flow to the rooms.

If you have radiators, an air-locked unit may be keeping the heat out of some rooms. Bleed the air through the valves on the radiators until water appears.

If the circulator of a hot water system is not working, maybe it has bound up because of lack of lubrication. Lubricate it now and press the reset switch or give the unit a sharp slap with your hand to help free it.

See that there is water in the boiler of a steam system. A burner will shut itself off automatically if water falls below a safe level. If the boiler is hot, let it cool before refilling. Cold water could crack a hot boiler.

Suppose, though, that the delivery system is okay and that the furnace itself has failed. There is a definite procedure to follow that could overcome the problem. Here's a checklist to use for both oil burner and gas burner furnace failure.

Oil burner checklist

■ **Thermostat inspection.** Perhaps the test you made which required you to shove the thermostat way up overcame this failure. Someone may have inadvertently set the thermostat down.

Day-night thermostats have given many homeowners fits. If someone reverse the cycle, the nighttime setting, which is normally cooler, will prevail during the day. This could cool the house down and make you think the furnace has conked out.

If day-night settings are normal, check under the cover. Older thermostats have a tendency to gather dirt on the contact points which can keep them apart. This interrupts the circuit and prevents furnace operation. Draw an index card between the points to get rid of dirt. Thermostats that have sealed mercury capsules don't have this problem.

■ **Fuse or circuit breaker check.** Don't just look at a fuse. Turn it to see if it has come loose. Try replacing it. You may not be able to see if it's bad by eye, so keep spares on hand for emergencies like this. The fuse may be a cartridge or screw-in type. If the circuit breaker has tripped, reset it.

There should be no other electric devices operating on the same circuit as the furnace, but if there are, keep them turned off. If the breaker trips again or a new fuse blows, don't press the issue. There's probably an electrical malfunction that requires the expertise of a service technician. Haul out the extra blankets.

■ **Emergency switch check.** Accidentally turning off emergency switches accounts for more oil burner "failures" than anything else.

Oil burners are generally outfitted with two emergency switches and in some cases three or four. It's a good idea to find them all now, before the storm, if you don't know where they're located.

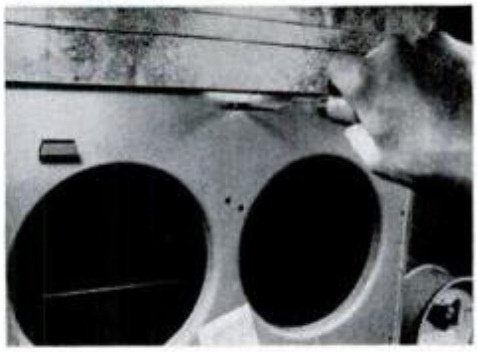
There is usually one switch on the furnace itself and another away from the furnace at the head of the cellar stairs or on a joist above a cellar door. That switch at the top of the basement stairway is the one that gets mistaken for a light switch most often and is turned off. Good-by heat.

■ **Oil capacity check.** Let's not overlook the obvious. Do you have oil? No oil, no heat. You can check the tank with a dipstick.

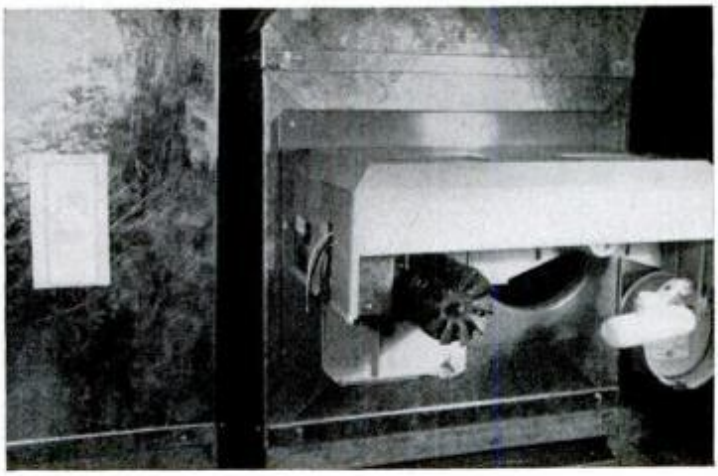
■ **Safety switch test.** Safety switches protect an oil burner from a problem that can cause major damage. There are usually two of them: a motor overload switch that protects the oil pump motor against electrical surge, and a stack-control

(Please turn to page 146)

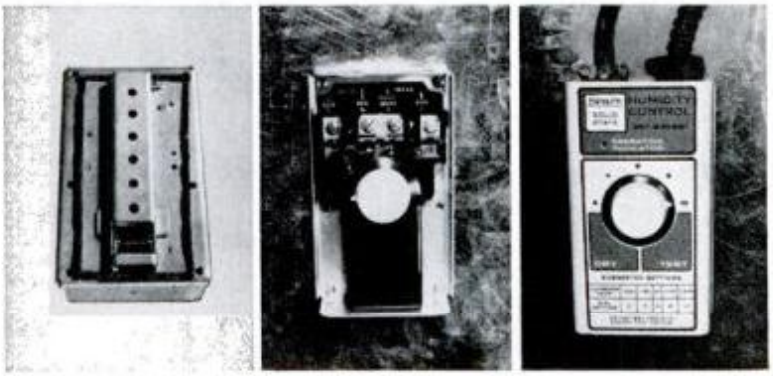
11 Get more warmth for your money with a humidifier



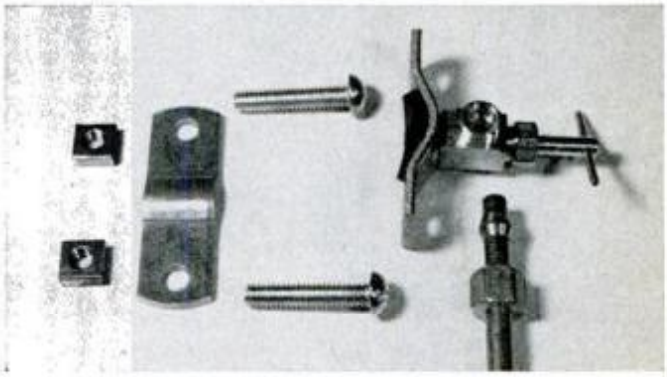
Humidifier box is mounted on a plenum stiffener. For the Sears unit we used, a section of the supply plenum is cut away and the stiffener is attached with screws.



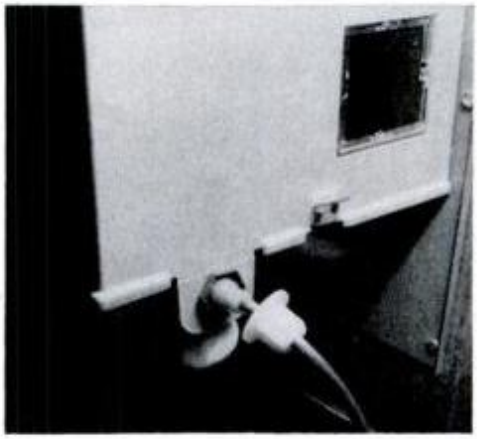
The plastic housing is supported by mounting tabs on the stiffener and secured by pressing a capped fastener (all of the attaching hardware is provided with the unit) through the back panel. A paper cutting template for the humidity limit control is glued to return air plenum. Dotted lines on the paper indicate the exact cut lines.



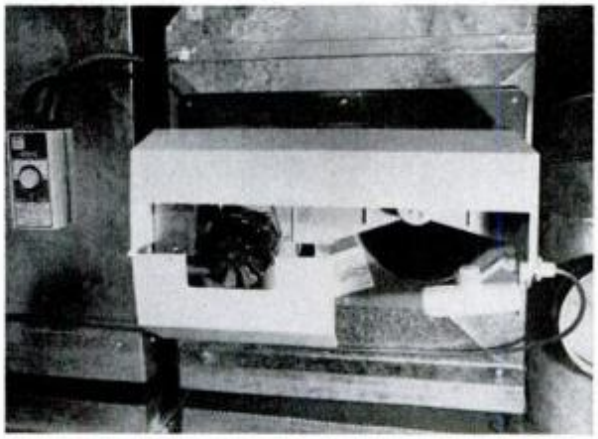
The humidity sensor on the back of the unit reads moisture content of return air. Foam strips make a tight seal between the unit and the duct. Setting directions are on the face.



A saddle valve is clamp-mounted to a water line near the furnace. Copper tubing with a compression fitting connects to the valve. A piercing stem inside taps into the line.



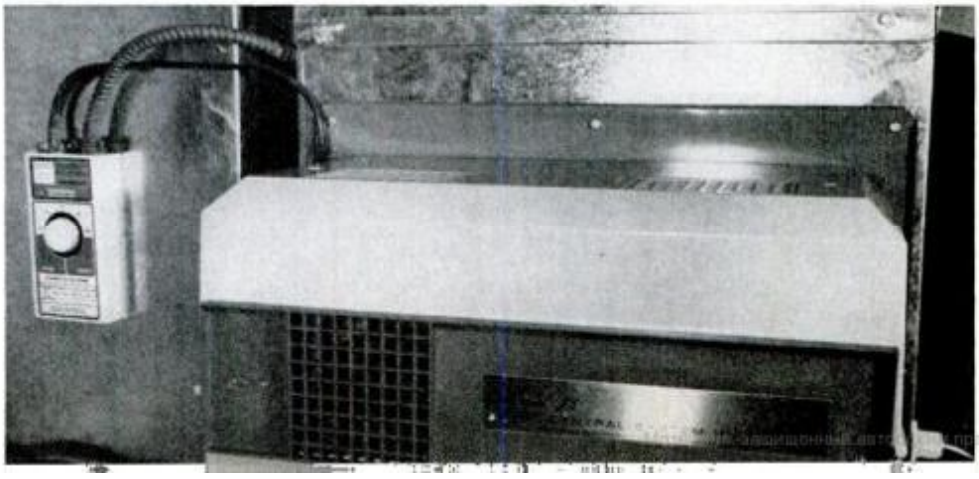
Copper tubing is attached to humidifier with a nylon compression nut. Water level is regulated by a float valve.



The humidity limit control is wired to a fused 120-volt circuit and the blower motor switch. The float valve is seen at right where the tubing enters.

The plastic water container under the float is easily fitted and latched securely.

Complete the assembly by snapping in the front vent grille. Although it's not necessary for operation, a system is built into the tank which can replace the standing water supply regularly to prevent lime buildup. In this case you must run a hose between the tank and a drain outlet. The Sears Model 75 we used sells for $97.75, can evaporate up to 13 gallons of water per day and is suited for homes in the 2000-sq.-ft. range. An added note: Sears installation directions continue to be clear, well organized and well illustrated, an important part of the product for do-it-yourselfers that's often overlooked.



Chef's knives you can make

Follow PM's patterns to make your own kitchen knives with fine steel blades and rosewood handles.

by Mike McClintock
HOME AND SHOP EDITOR

Материал, защищенный

It pays to use top-quality tools on your shop projects. They make your job go faster and look better. The same is true for kitchen tools. Now you can avoid the high cost of fine imported cutlery by making your own.

The key is locating the right materials (they'll run about $15 for the set) and using the right tools to make them. PM has done this advance work for you so you can concentrate on the construction. You won't need exotic metalworking tools.

Knives are usually made on a forge where a controlled heat makes the metal malleable enough to shape with a hammer and anvil. Since this setup is not available to most home craftsmen, we designed a set of three knives, made from oil-hardening steel, that can be processed using either an oxyacetylene or oxypropane torch as the heat source.

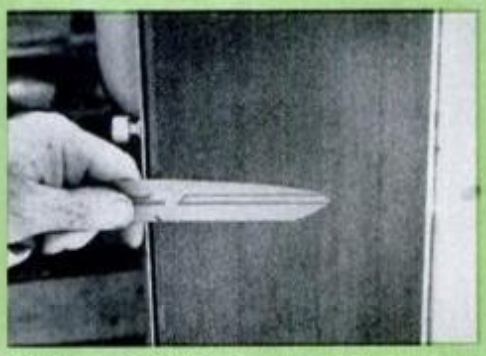
The blade (skeleton) is made from Starrett No. 496 oil-hardening, precision-ground flat stock. For a distributor in your area, write to the L.S. Starrett Co., Athol, Mass., 01331.

Blade preparation

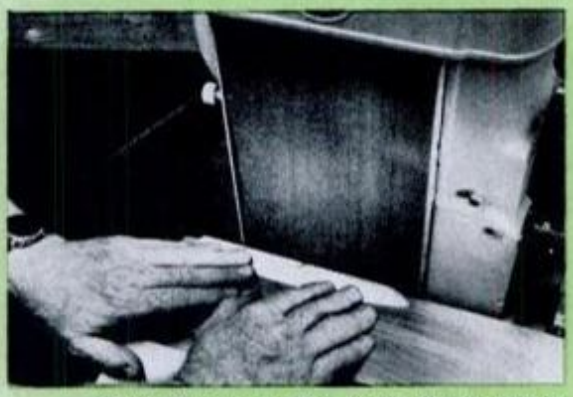
Make full-scale paper patterns for the blades using our grid plans (page 111). First, you rough-cut the skeletons with a hacksaw. Then take the blades down to their final outline using a belt or disc sander.

After drilling the rivet holes with

Clamp the steel blank in a vise and cut out the profile with a hacksaw. Use the grid plan on page 111 to make patterns.



You can use either a belt or disc sander with a No. 100-grit abrasive to sand the sides down to the tapered edge.



Clean the top profile of the blade, called the skeleton, on a sander. A smooth-cutting file will also clean the edge.

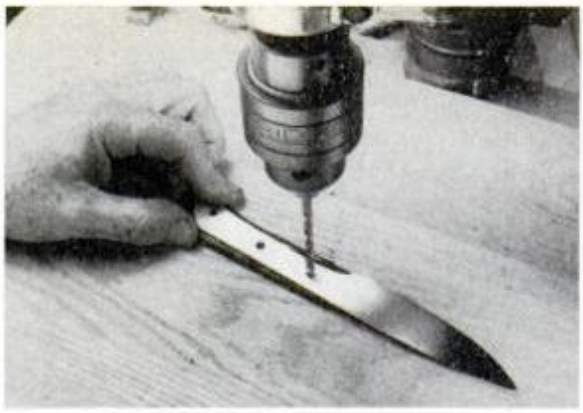
Rough down the concave part of the handle section with a second-cut file and follow this up with a smoothing file.

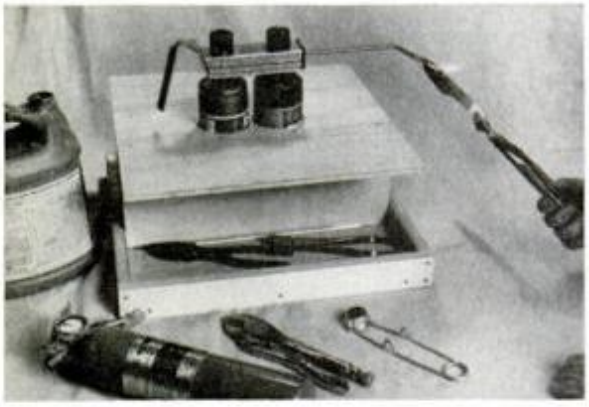
Clamp the skeleton to a piece of scrap wood in a vise. This leaves both of your hands free to control the file.

Lubricate the steel with oil and sand with progressively finer grits (from 120 down to a fine 320) of silicon carbide paper.

PM photos: Benn Mitchell

Use our grid drawings to make full-size paper templates for the knives. Mark the locations of the rivet holes and drill them out with a No. 17 bit. The patterns and their corresponding steel skeletons shown at right have been sanded clean and are ready for heat treating, tempering and a final sanding before the rosewood handles are attached.





New BernzOmatic oxypropane torch is a high-quality metalworking tool that can develop enough heat to simulate a forge. It sells for about $40. We made a simple caddy to hold it securely and played safe by having a fire extinguisher handy. We used Devcon five-minute epoxy to hold the handle sections, called scales, to the steel during riveting operation.

Attach rosewood scales one at a time. Using the holes in the steel as a guide, backdrill the first scale with a No. 17 bit. Then glue on the other scale, turn the knife over and use the holes in the handle as a guide to drill out the second handle section. Follow by counterboring for the brake rivets and brass FH screws, assemble and fine-sand to finish.

a No. 17 bit, sand and file the beveled cross section on the skeletons. We drilled the holes at this stage while the steel was soft enough to work. If you were to heat-harden the handle first, you'd have to buy a special bit to drill through it or go back and heat-treat the area to soften the spots where the holes go.

After the rough cutting, a gradual process of filing and wet sanding will finish the shaping. Attach the skeleton with a C-clamp at the end of the handle to 1x3 or 1x4 stock. Mount this board in a vise on the flat with the clamp toward you. Don't worry about filing marks on the steel.

When you've completed the shaping by finishing with a smooth file, start a wet sanding schedule using silicon-carbide paper and oil as a lubricant. Begin with a No. 120 grit, gradually remove the tooling and grit marks from the filing stage. As heavy marks start to fade, switch to a finer grit all the way down to No. 320. Complete this stage by working the skeleton with oil and 4/0 steel wool.

Heat treating

Tempering steel may seem too specialized for a do-it-yourselfer, but with preparation, you can do the job easily. To make the steel hard you have to heat it, quench the skeleton in oil and temper it. We used a BernzOmatic oxypropane torch, mineral oil for quenching and a kitchen oven set at 400° for tempering.

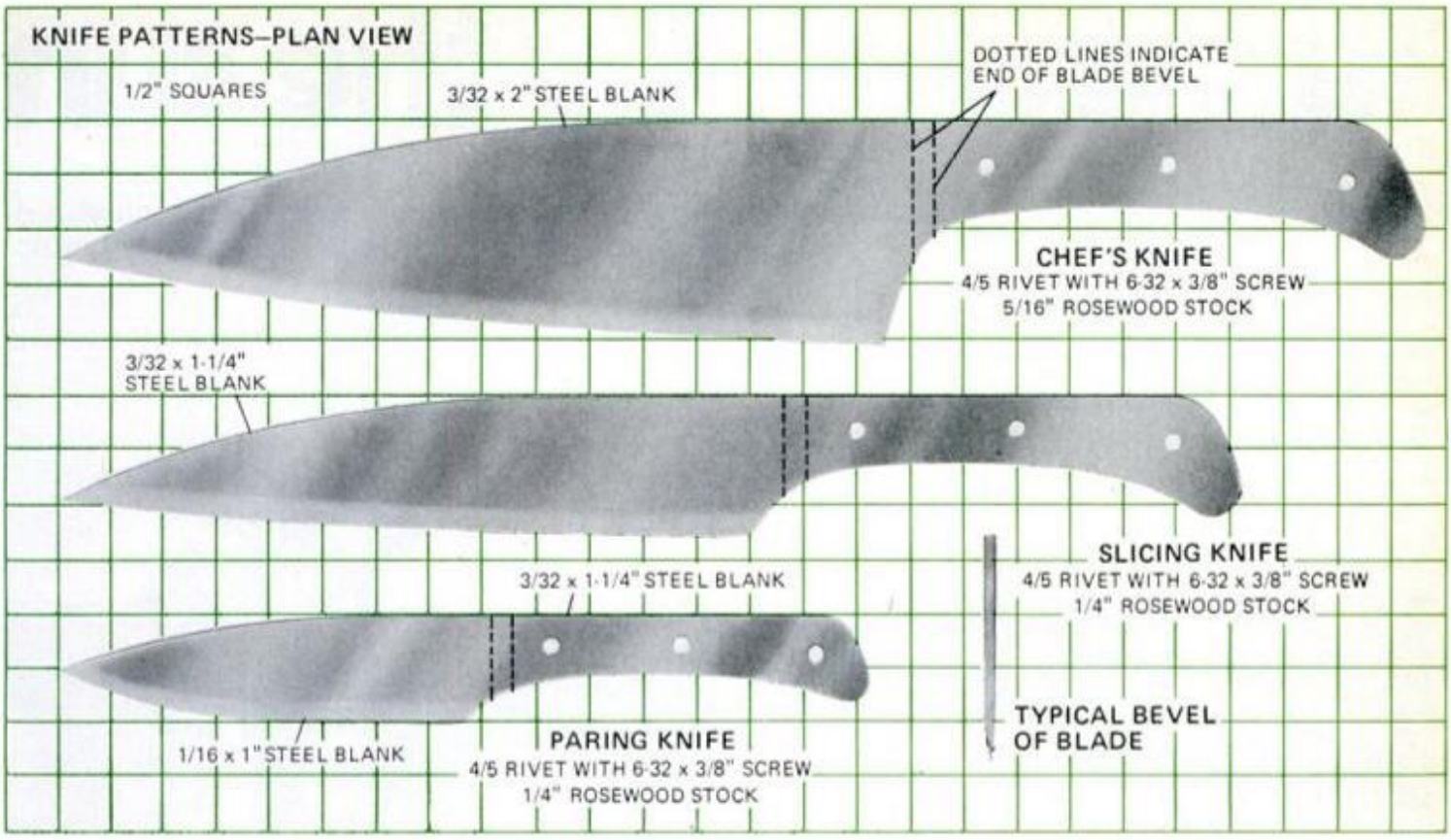
Here's how to do the job efficiently and safely. To leave both hands free and avoid accidentally knocking over the torch, we built a simple but stable caddy. Don't apply any finish to the wood. Set up your work on a fireproof work surface like Transite or other asbestos board. Then make sure there are no combustibles, such as thinner, pipe dope or oil paint in the immediate area. Cut off the top of a gallon metal can and fill it with enough mineral oil to cover the knife when it's inserted vertically.

For this job wear gloves and goggles. Put long-handled pliers and a torch igniter in the caddy and as a safety measure keep an ABC-rated fire extinguisher handy. If you don't already have one, use this project as an excuse to get it.

Check the manufacturer's instructions before you start. Usually the procedure is to ignite the fuel and adjust it to a 4-in. flame. Then add oxygen slowly until you get a blue light inside the flame about ¾-in. long. Hold the steel with your pliers and heat it uniformly until it reaches an orangy color. Experienced forgers often use a fresh orange peel as a guide. Then immediately quench it in the oil, point first, for about 10 seconds.

To temper the blade, clean and dry it completely and hang it with a wire from an oven rack for one hour at 400°. After it's cooled, clean it with

Материал, защищенный авторским правом



PM art: Fred L. Wolff

fine silicon carbide paper and oil followed by 4/0 steel wool and oil.

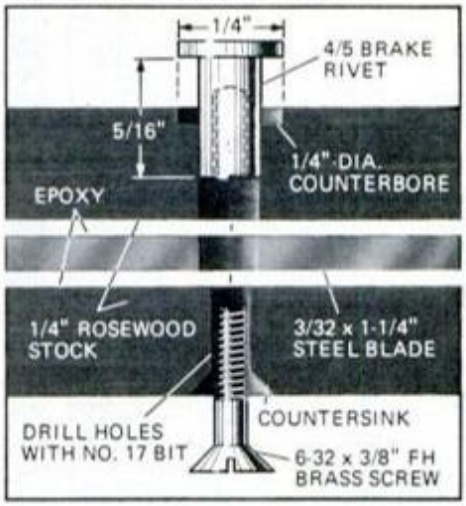
Rosewood handles

Depending on knife size, cut your handle sections, called scales, from ¼-in. or 5/16-in. rosewood. We used Devcon five-minute epoxy to attach one scale, let it cure, then drilled through the rivet holes with a No. 17 bit. Repeat for the other scale.

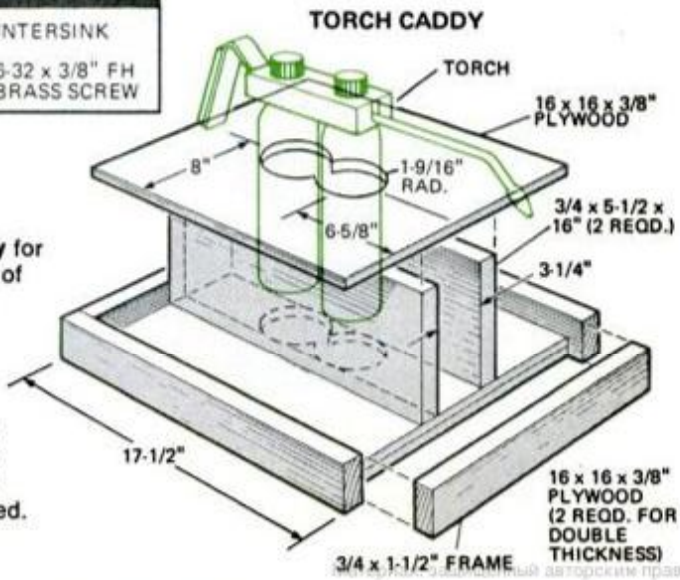
We searched for matching male and female rivets, but found they were only available in huge quantities. We got good results with 4/5 brass brake rivets (try an auto supply store) and No. 6 FH brass machine screws. Make the counterbores carefully and press home the rivets in a vise. Leave enough of the screwhead showing to file away the slot. Finish by sanding the scale edges flush with the skeleton edges.

Blade sharpening

To put an edge on your new blade, make repeated diagonal strokes on a soft Arkansas stone, then on a fine India stone using oil liberally. To finish, use a hard white Washita stone with water. Fine-sand the handles and apply a thin coat of vegetable oil to the rosewood. ★★★



Commercially made knives use male-female rivets to secure the handle sections. We found that these were only available in high quantities and substituted the detail shown at left. It uses 4/5 brake rivets that you can get at an auto supply or brake shop and FH brass machine screws available at hardware stores. Use a brad point or a Forstner bit to make the flat counterbore for the brake rivet.



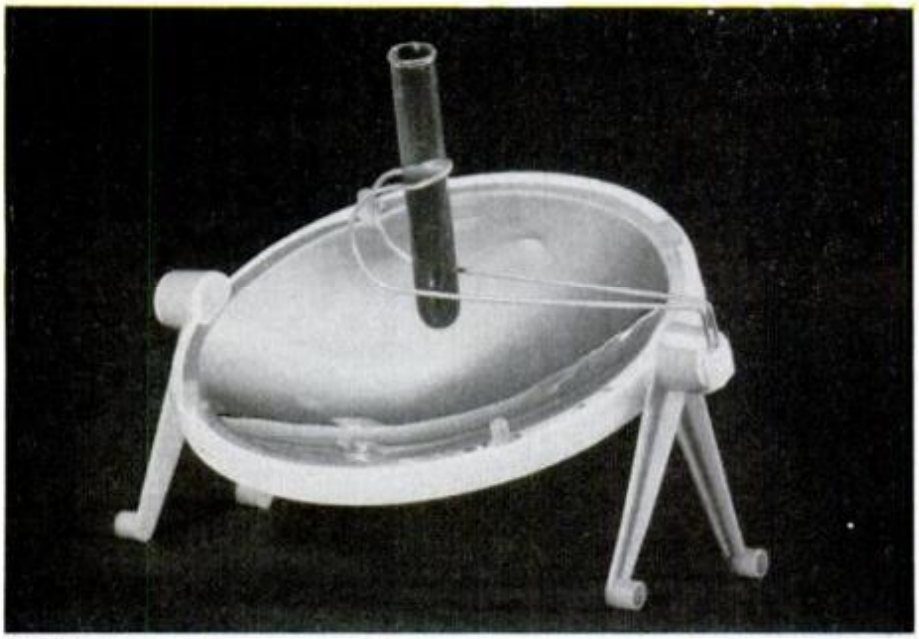
We made this simple caddy for the BernzOmatic torch out of scrap wood. Don't apply a finish or glue. You can use the base sections to keep your pliers and torch igniter at hand. Make sure you don't operate the torch near any combustible materials and keep the area well ventilated.

Материал, защищенный авторским правом

Turned on by the sun

New solar energy technology is being used in a cluster of small-scale gadgets that are surprisingly cheap.

by Mort Schultz



A 6¾-inch parabolic reflector is used to concentrate heat on a test tube hooked onto stand. The inexpensive unit, ideal for science projects, is $3.25 from Edmund Scientific Co., Barrington, N.J. 08007. Other products shown here are also available from Edmund.

No charcoal, starter or flame—what a way to cook! This 1-pound portable solar cooker adjusts to track the sun. Solar furnace (top right) uses a Fresnel lens to develop focused heat of 2000°. At right is a cute little $3000 item: a 70-inch Fresnel lens with 60 focusing grooves per inch—one of a kind.

An amazing number of solar-energy gadgets are available to you at surprisingly low prices. Now you can get a digital watch, a flashlight, a soldering unit, a portable cooker and oven—even a portable water heater for $9.50—all operated by solar energy. Soon you may even be able to get a solar-powered razor.

All this is possible because of better solar-cell technology and decreased solar-cell prices—down to $15 per watt unit from the $500 of 15 years ago.

Solar cells have no movable parts to wear out. Furthermore, the fuel they use is clean, abundant and free. At any instant, the sun delivers 1000 watts per square meter to the earth's surface, most of which is absorbed as heat by the sea, air and earth.

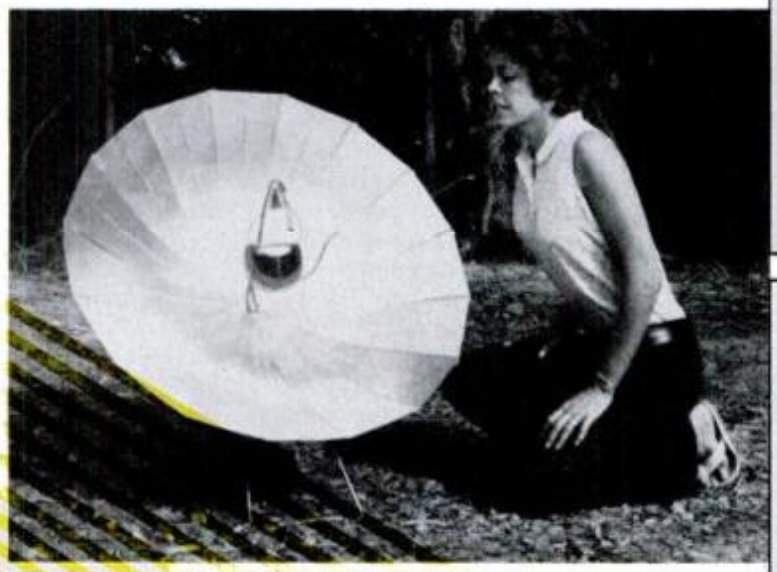
Wafer-thin solar cells are able to convert some of this light energy into electrical energy through a process known as the photovoltaic effect. Here's how it works:

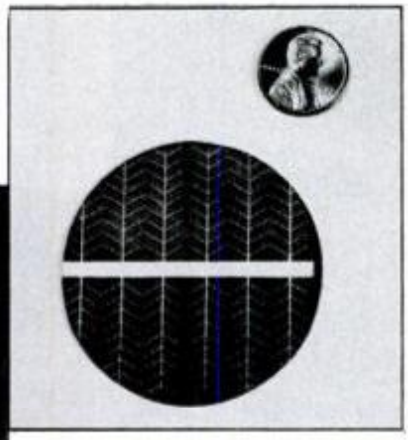
Silicon, a poor conductor in its pure state, is doped with other elements to obtain negative and positive charge carriers.

Boron-treated silicon produces negative (N-type) carriers called electrons. Phosphorous-treated silicon gives positive (P-type) carriers called holes.

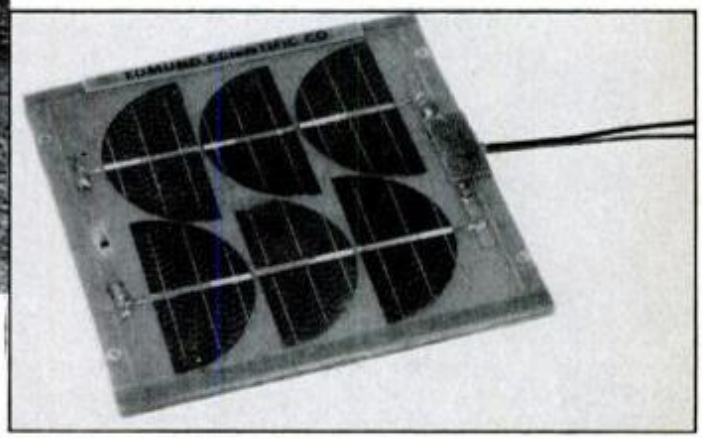
The N and P-type silicon chips are fused to form a solar cell. In sunlight or incandescent light, incoming units of light called photons are absorbed by the cell. Red light penetrates deeply and is absorbed by the P-type silicon. Blue light is

Folded up, it measures only 2x8x20 inches, small enough to be portable. The lightweight aluminum reflector (it weighs 2 pounds) unfolds to form a 36-inch-diameter parabolic reflector which comes equipped with a cooking arm and tripod mount. The interlocking panels are secured with a single center wingnut. The price is $22.95.

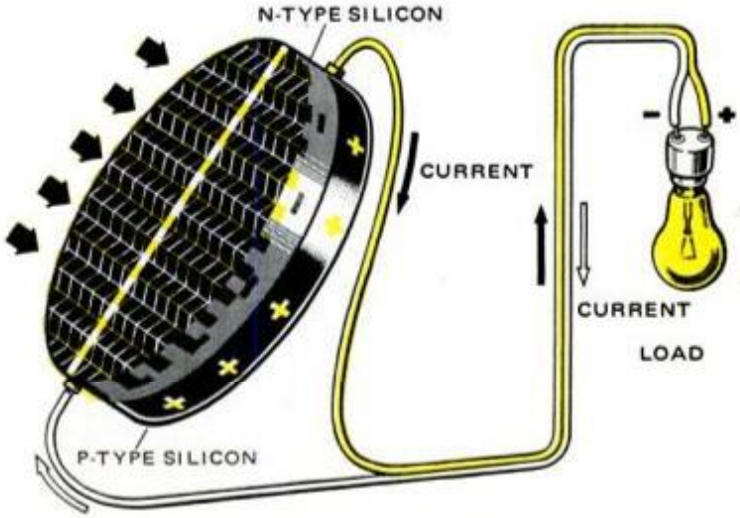




Single cells come in a variety of shapes and sizes, including 4-inch-diameter units (left) as well as smaller pie wedge and square cell sizes below. N/P type silicon units come with tab leads and a transparent protective coating. Efficiency is estimated at a minimum of 10 percent.



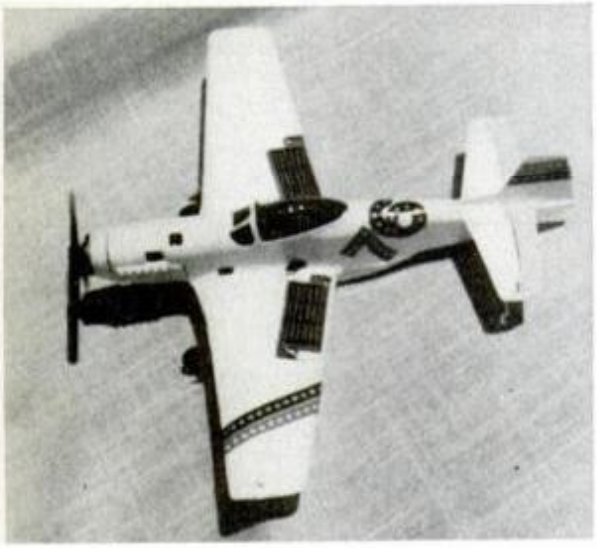
Do you like the idea of free batteries? These flashlighs use a detachable solar array to supply power. Leave them in the sun to charge and clip them onto the light whenever you need it.



Power produced by the negative and positive-type silicon wafers runs through the leads to a d.c. load or battery.

Материал, защищенный авторским правом

Solar panels are available in all shapes and sizes. There can be units with as few as four and as many as 96 cells. The units provide d.c. power, are sealed for outdoor use and come with polarized leads.



Solar supplies on the market now make it possible to convert some conventionally powered machines like the cassette recorder and the model plane to run on sun power. We found the ingenious plans for the solar plane in the July '76 issue of *Radio Control Modeler* magazine. Six 2¼-inch cells on each wing and a diode regulator supply voltage to a 4.8-volt battery, radio control and three servos. Complete solar drive weighs 2 ounces, needs weekly charging.

absorbed just below the surface by the N-type silicon.

The separation of light into energy units produces a flow of electric current. The life of this power source would be too short to be used (about one millionth of a second) were it not for another element of the cell called a junction.

Electric current would cease as soon as the two units of light (red and blue) recombined, so the job of the junction, which is made by diffusing phosphorous into boron-treated silicon at high temperature, is to keep them apart to maintain the power source.

Gimmicks, gadgets and tools

Theoretically, it is possible to use solar cells for any application that requires electricity. For example, Edmund Scientific Co. stocks two groups of solar products—those with solar cells and those using solar energy directly without cells. Edmund has a solar-cell electronic digital watch and a solar-cell flashlight (conventional and camper models). The electronic digital watch uses nine ½-volt solar cells to charge a 2½-volt rechargeable battery. Recharging is done by leaving the watch face to the sun or under an incandescent lamp.

The watch provides five functions: hours, minutes, seconds, month and date. It weighs only five ounces, is guaranteed for one year, sells for $199.95 and is made by the Uranus Electronics Corp. of Port Chester, N.Y. It is sold only through selected distributors.

The flashlight has nine solar cells that produce 40 milliamps at 4.8 volts to charge two "C" size nickel cadmium rechargeable batteries. Fully charged, it can operate for about two hours. The cells need about a week of exposure to sunlight or incandescent light to fully recharge the batteries.

The conventional flashlight sells for $29.95; the camping model, $49.95. Edmund also retails solar cells and panels for whatever use you wish to make of them.

Solar building blocks

Individual cells range from $1.95 to $29.95. The smallest produces a current of 10 milliamps. at .45 volt. The largest, with a 4-inch diameter, delivers a full watt of power. Its current is over 2 amps. at .45 volt.

Solar panels sell from $39.95 to $995. The smallest combines four 2¼-inch solar cells to give 280 milliamps. at 1.5 volts. The largest utilizes 36 4-inch cells to give 2.1 amps. at 14 volts.

A variety of other panels available are listed in Edmund's catalog; to get it, write Edmund Scientific Co., Barrington, N.J. 08007.

Although it presently is not available, a solar-cell electric shaver may be ready by Christmas '77. One has been developed by N.V. Philips of the Netherlands, which offers the Norelco brand in the United States.

The shaver case will contain nine solar cells which, when exposed to the sun or incandescent light for 24 hours, will charge the unit for three weeks' worth of shaves. The company told PM it hopes to be able to put the units on the market for about $100.

Hot water and hot dogs

Other solar products include devices that use the sun to do work without the need for solar cells. Here's a lineup of available products:

■ **Solar furnace**—This device de-

(Please turn to page 154)

This 12x19-inch vinyl water heater weighs 12 ounces empty, holds 10 quarts of water. Three hours of sun on a 70° day will take temperature inside up to 100°.

Материал, защищенный авторским правом

Complete guide to furniture finishing

Here's how to revitalize your old favorites as well as treat new 'raw' wood units.

by Penelope Angell
ASSISTANT HOME AND SHOP EDITOR

It makes good sense to learn how to finish furniture. That skill can often be the key to filling your house with valuable antiques at bargain prices. You can also acquire new furniture less expensively if it's unfinished. With a little patience and a moderate bit of work, you can put a professional finishing touch on all types of furniture.

Finishing is a step-by-step process; along the

We finished our rolltop desk with a penetrating resin. The rocking chair was stained, then finished with polyurethane. Our mirror is finished with glossy lacquer.

PM color photos: Stephen Fay

DESK As wood prices skyrocket, the purchasing of raw furniture to finish at home is becoming more and more popular. We finished this white pine rolltop desk with Watco Danish oil, a penetrating oil and resin mixture. The finish added a slight honey color to the desk but let the character of the natural pine stand on its own.

The first step, as with finishing all raw furniture, was to sand the wood smooth with the grain. This was done using successively finer grades of sandpaper. Some new unfinished wood is very rough and will require extra work.

Since we used a penetrating finish, a sealer coat was not necessary. However, most other types of finish (see chart) required that the wood first be sealed with a coat of final finish thinned with turpentine or a commercial lacquer-based sealer.

The finish we used was applied liberally with a brush. More was added to areas that soaked it up. After 30 minutes we wiped off the excess with a cloth, smoothed the wood with 3/0 steel wool, and applied another coat for 30 minutes. The excess was again removed and the surface was smoothed. Next day two thin coats of butcher's wax were applied on the surface, left for 15 minutes and buffed.

1. At the Woodsmith's Studio, Jarrett Strawn uses a block with 150 finishing paper to give our desk a final sanding.

2. Penetrating resin is applied liberally to the surface. Any spots that drink up the finish get an extra dose.

3. Any penetrating resin not soaked into the wood after 30 minutes is wiped off with a clean, natural-fiber cloth.

4. The surface is carefully rubbed with 3/0 steel wool to smooth the wood. Then another coat of finish is applied.

way you must make a few decisions. When working with older furniture, you must first decide whether to restore or remove the old finish. If it is removed, you can bleach the bare surface to make it lighter. After that, the surface can be treated in much the same way as new, unfinished furniture. Sanding, staining, sealing and filling are all possible steps that lead to applying the final finish.

Here's how to strip off the old (you may find a beautiful hardwood underneath that paint) and give your furniture a handsome and protective finish.

Why do extra work?

While most of us don't have to worry about devaluing a precious antique by removing the original finish, sometimes it simply isn't necessary to remove a slightly damaged one.

Original transparent finishes can be considered sound if they are clear so the wood pattern can be seen, and a coin or fingernail doesn't scrape down to the bare wood when run across the surface. Merely clean the finish with a cloth slightly dampened in mild soap and lukewarm water, dry, then rewax or polish.

You can restore dull, transparent finishes with a single coat of the *same* finish originally used. Remove the wax with water and detergent, dry, sand lightly and apply the finish.

Here are some clues to detect the type of finish: Lacquer has been used on most *mass-produced* American furniture in recent years; shellac could well be on *old furniture* that still has its original finish; and varnish has been used most often in past years by *home craftsmen*.

If paint finishes are chipped, but not cracking or flaking off, they can be painted over. Clean with turpentine, feather out any chipped paint, and degloss the paint with fine sandpaper. Then you're ready to repaint.

Stripping the old finish

If the old finish can't be preserved, you can apply a stripper to remove it, then start from scratch. The easiest type of stripper to use is in a semi-paste, jelly-like form (Zip Strip, Stripease, Wonder-Paste). Some wash off with water and others with mineral spirits. You'll need a natural bristle paintbrush (chemicals in the strippers can soften synthetic bristles), a paint scraper or putty knife for softwoods, 2/0 coarse steel wool, rubber gloves, a couple of coffee cans, rags and mineral spirits or water for cleanup.

First read the directions on the can. When you're ready, just brush the stripper on liberally and allow it to soften the finish. After waiting for 10 or 15 minutes, you should find it soft enough to scrape off with the putty knife or steel wool and be dumped into the coffee can. Wash off the whole piece with water or mineral spirits, whichever is called for in the directions.

On ornate pieces with intricate carvings and turnings, the stripping process can be rather time-consuming. But if you find a beautiful wood beneath the layers of paint, it can be well worth the effort.

Bleaching to remove color

Commercial bleaches to reduce pigment left by strippers, or to lighten the natural wood color, are available at paint and hardware stores. Use a natural bristle brush to apply the bleach evenly to the clean wood surface. The bleach will raise the grain and it will be necessary to sand after the bleach has dried.

Preparing the surface

After removing the old finish, you can repair surface dents, scratches

(Please turn to page 130)

Материал, защищенный авторским правом

ROCKING CHAIR

When we got this decorative rocking chair from a second hand store, it was covered with countless coats of paint. In fact, stripping was a two-can job. We used Bix stripper, a jelly-like substance that stays on vertical surfaces better than liquid strippers. This was applied liberally with a brush, allowed to soften the paint (about 15 minutes in this case), then carefully scraped off with a putty knife so as not to damage the softened wood. A toothbrush and coarse No. 2 steel wool were also used to remove the stripper on the turnings and in other tight spots.

We uncovered a lovely hickory chair with a pine seat and delicate carvings on the back. Hickory is a very porous wood, and the paint remained in the pores. The chair could have been bleached to remove the pigment. But since the paint in the pores was a reddish brown and the chair was an indefinable country style, we let the light paint speckling blend in to look rustic.

The next day a mahogany oil stain was applied to the chair with a rag. The carvings on the chair back were kept lighter to accent them. The third day the first of three polyurethane coats was given.

1. The rocking chair was covered with many coats of paint. But its excellent condition otherwise made it good project.

2. Stripper and paint are scraped off the chair with special care to avoid any damage to the softened wood.

3. Mahogany oil stain is applied with a clean, natural-fiber cloth. Any excess is wiped off the wood.

4. The first coat of polyurethane finish is brushed on the rocking chair with careful strokes to cover surface evenly.

FINAL FINISH CHART

Types	What they do	How to use them
Shellac	A past hero, shellac is not used much today because it isn't very water-resistant and is soluble in alcohol. But it *is* easy to apply and dries quickly. Since shellac has such a short shelf life, it's best to buy shellac flakes and dissolve them in denatured alcohol as needed. A 3-lb. cut (3 lbs. of flakes per gallon of alcohol) is a good ratio.	Thin first two shellac coats to 2 parts denatured alcohol and 5 parts 3-lb. cut shellac. Apply final coat full strength. Rub with 3/0 steel wool and clean with a tack rag after first coat has dried fully—at least 3 hours. Finishing takes patience. Apply 3 more coats, rubbing between coats with steel wool; then clean and wax. Note: Shellac clouds in high humidity, so work in a dry place.
Lacquer	Lacquer is a fast-drying, very clear finish. It wears longer than shellac and is more water-resistant. However, it can crack if exposed to extreme temperature changes.	Since lacquer is so quick drying, you'll be wise to use spray equipment. Some lacquers, such as Delt, come in a spray can. You can also buy brush-on lacquers with drying retardants for a better chance at a smooth finish. When lacquering bare wood, thin the first coat to seal the wood and apply generously until wood has had time to soak it up. After it dries, rub with 3/0 steel wool and clean. Apply full strength and let dry 2 hours or more before using steel wool. Recoat, let dry 24 hours and rub.
Varnish and poly-urethane	Super polyurethanes give wood a very hard finish that withstands water, alcohol and mild scratches. Regular oil-based varnish, not quite as hearty, is longer-drying. Neither is easy to apply; both pick up dust while drying—which takes fairly long. Polyurethane finish comes in satin or gloss (Gloss Zar or Satin Zar, Minwax satin or gloss).	Polyurethane takes time to dry (at least 6 to 8 hours) and varnish takes longer, so plan to apply a coat daily for 3 days. But don't exceed 24-hour dry time between coats or urethane will harden completely, making other coats hard to apply. When brushing on urethane, thin first coat to seal the wood pores according to directions. Use 3/0 steel wool or fine sandpaper between coats. Polish final finish to the sheen you want.
Pene-trating resins	Easiest of finishes to apply, among most durable. Most are actually oil and resin mixture. As the name implies, they impregnate wood, fortify fibers. (Wood should not be sealed when this is used.) Some types have stain in finish (Flecto oil sealer). Another plus for penetrating resins: If wood is burned or scratched, rubbing with steel wool can repair it.	To apply, just pour it on the surface and smooth with a natural-fiber rag (purists often use a hand) to let wood absorb the moisture. Wipe up excess with a natural-fiber, lint-free cloth. Apply a second coat almost immediately if the wood soaks up the first. Let second coat dry—at least 36 hours to be sure—then cut the gloss with 3/0 steel wool. Apply more coats; dry and degloss each until the wood has an even tone.
Oil	A craftsman's finish for a special piece of furniture, a true oil finish is often preferred by professional finishers. Many have their own favorite recipes. One formula is *boiled* linseed oil and turpentine in a 3:1 down to a 1:1 ratio. Some antique finishers use refined beeswax dissolved in equal parts of boiled linseed oil and applied to the wood while the mixture is warm.	Saturate a natural-fiber rag in the oil mixture and rub thoroughly into one small area at a time until the whole surface is coated uniformly. When the wood will not absorb more oil, wipe off excess with hard-fiber cloth like denim. Wait two or three days, then apply another oil coat. After several weeks, apply a final coat. Oil once or twice yearly.
Wax	Paste wax can be used as a primary finisher *if* the wood has been sealed with white shellac or other sealer.	Apply a thin, even coat with steel wool or a soft cloth. After 5 to 15 minutes, buff with a clean cloth and repeat.
Paint	A fantastic range of paint colors is available—or you can brew your own. Spray lacquers are good for special pieces like wicker, wrought iron or carved furniture. Alkyd "oil base" enamels are the most durable furniture paints. Untreated wood should have a sealer coat of thinned shellac. All furniture should have a base coat.	After smoothing all surfaces, brush on an undercoat as evenly as possible. Let it dry and smooth it with fine sandpaper. Next, apply a half-and-half mixture of enamel and undercoating (made by the same manufacturer), let dry, sand and clean. Apply the final enamel coating. It should cure—this can take up to two weeks—before rubbing with a mixture of FFF pumice and water or oil.

HANDMADE WITH CARE

Build a loom for weaving fun

Here are loom plans and weaving directions for an easy family project.

by Elma and Willard Waltner

You can build this frame loom from ¾-in. hardwood stock for a total cost of about $10. Besides wall hangings, it can be used to weave throw rugs, tote bags or whatever you can create. Experimenting is half the fun.

We call it a lap loom. With the back part resting on the table, the front end rests in your lap—quite a comfortable working position. You can use it to weave pieces up to 20-in. wide. It can be strung for tapestry-type weaving where the warp (the threads running lengthwise through which the filling threads are woven) is completely hidden as it is

Our PM loom was perfect for weaving the wall hanging above. Here, the weaver beats down the yarn with a tapestry beater to completely cover the warp ends. Color, texture and pattern all play a part in our handsome hanging.

PM photo: Harry Hartman

in our wall hanging. It can also be strung in the regular way where the warp is part of the color scheme and design.

To become familiar with the various parts of the loom see the loom frame diagram below. The shuttle which carries the filling threads as they are woven through the warp can be formed to the dimensions in the diagram or purchased inexpensively. We used four shuttles to make the wall hanging.

Constructing the frame

Cut all of the pieces for the loom frame from ¾-in. hardwood stock. Either birch or maple would be a good choice.

Begin by cutting the two side strips (Fig. A) to the dimensions given. Drill the dowel peg holes ½-in. deep into the bottoms of the strips as indicated. The 3-in.-long, ¼-in.-dia. dowel pegs are used for measuring the warp. Two serve as support legs when weaving. Make the dado cuts as indicated to accommodate the two cross braces; then cut the latter (Fig. B). Four 2¼-in. screw hooks hold the cloth beam in front and the warp beam in back. Turn in the hooks ½ in. from the ends of the side strips as shown in the loom frame diagram.

The take-up beams (front and rear) are used to tighten and loosen the warp threads. They are moved by ratchets.

Cut the rear take-up beam and the warp lock strip (Figs. C, D). Drill ¼-in.-dia. holes ½ in. deep into the take-up beam as indicated. Use dowel centers to locate positions for matching holes in the warp lock strip, and drill these 5/16 in. deep. Cut three pieces of ¼-in. dowel ¾ in. long. Glue them into the holes in the lock strip. Sand the protruding pegs and round the ends so they will slip in and out of the holes easily (Photo 1). The warp lock strip will press against the rear take-up beam to "lock" the warp threads in place.

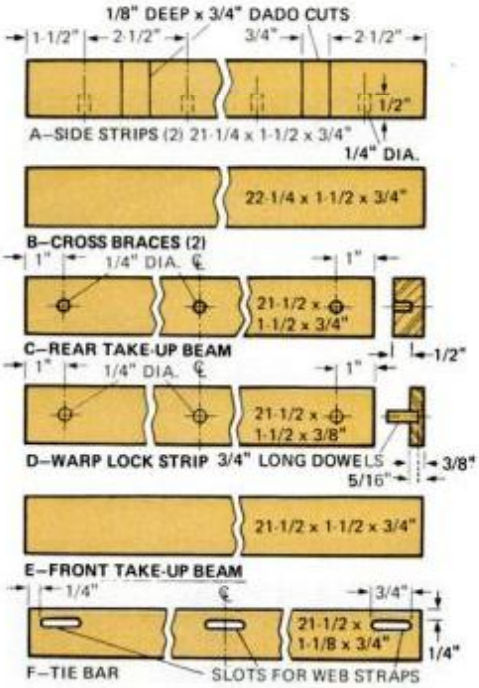
Cut the front take-up beam and tie bar (Figs. E, F). Later, the warp threads will be brought over the tie bar and tied to it. Web strapping material ⅝ in. wide is used to connect the tie bar to the front take-up beam. You can buy it at shoe repair or canvas shops. Three pieces, each 12 in. long, are needed. Cut the slots in the tie bar to let the webbing slip through. Seal the ends of the straps with white glue to keep them from fraying, then slip the straps through the slots. Nail the ends to one edge of the front take-up beam with carpet tacks (Photo 2).

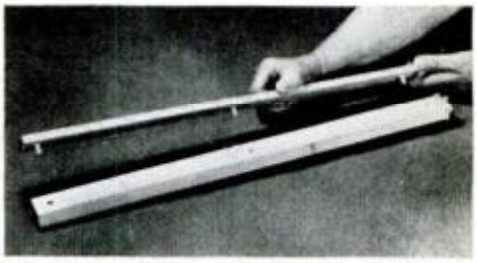
Ratchets and stops

The ratchets are wheels having notched teeth fastened to the ends of the front and rear take-up beams to turn the beams and help you keep proper tension in the warp threads. Saw the ratchets and the ratchet stops from ⅜-in. hardwood stock (Figs. G, H). The center hole in each ratchet is for a free-running axle. Mount the ratchets on the take-up beams by countersinking flathead screws (Photo 3).

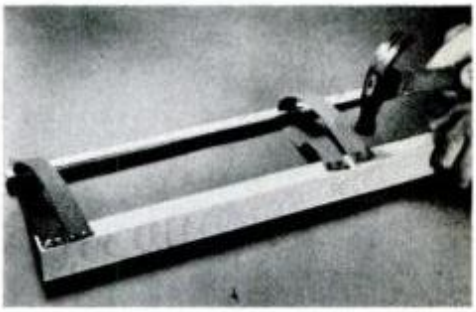
Heddle blocks

The heddle blocks hold the heddle, which in turn holds the warp threads. Cut the two heddle blocks

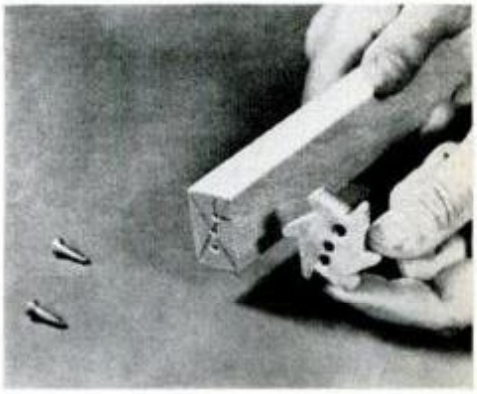




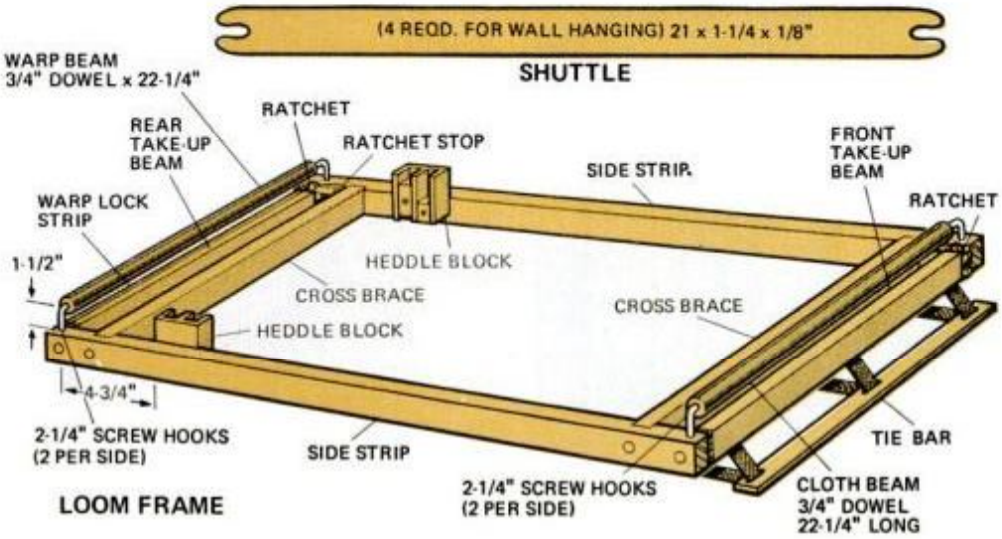
1 **The dowel pegs** in the warp lock strip fit into matching holes in the rear take-up beam.



2 **Three pieces** of ⅝-in. web strapping are brought through the tie-bar slots and tacked to the front take-up beam.



3 **Two screws** are driven through pre-drilled holes in the ratchet and into the end of the take-up beam.



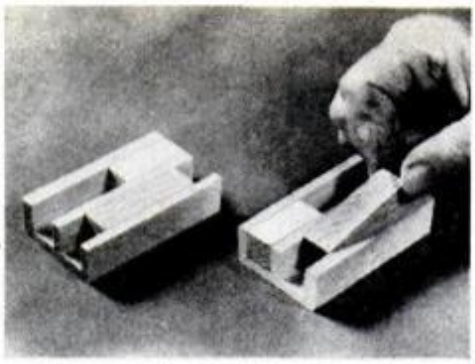
Материал, защищенный авторским правом

(Fig. I), making the dadoes indicated. Then cut the two plug pieces to fit the dadoes. Glue the larger plug into the left-hand slot, positioning it ½ in. from the top of the slot and ¼ in. from the slot bottom. Glue the smaller plug into its slot, flush with the bottom of the heddle block. Prepare the other heddle block the same way, *reversing the plug positions* so the blocks will line up with each other when on opposite sides of the frame. Secure the heddle blocks to the side strips by countersinking flathead screws (Photo 5).

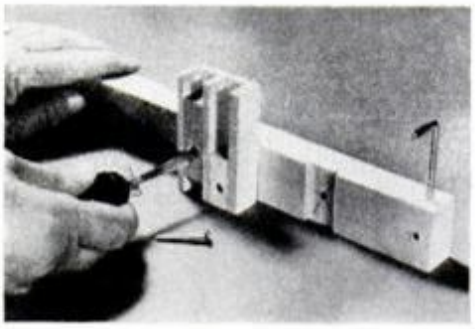
Assembling the frame

To assemble the loom, begin by fitting one end of each cross brace into the two dado cuts of one side strip and fasten with flathead screws countersunk from the outside of the strip. Drill holes into the center of the ends of the warp and cloth beam dowels and slip the dowels onto the heads of the screw hooks for partial assembly of the frame. Position the other side, slipping the screw hooks into the holes in the dowel ends and fitting the cross-brace ends into the dado cuts of the frame. The warp and cloth beam dowels should turn on the ends of the screw hooks (Photo 6).

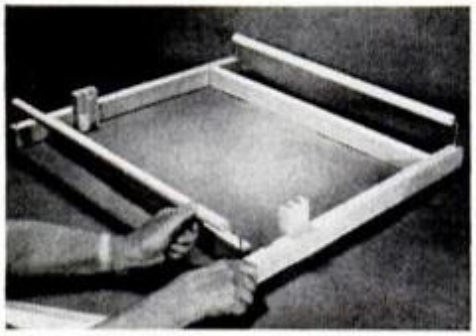
Set the rear take-up beam between ends of the frame, pass a roundhead screw through the hole at the end of the frame strip and drive it into the pilot hole through the ratchet and into the end of the beam. Do the same with the other side strip. Screws passing through the holes at the end of the frame act as axles for turning the beam. The front take-up beam and tie bar assembly are attached in the same manner. Screw on the ratchet stops. They swing freely on the screw shanks and drop into the ratchet teeth for locking to tighten the warp. Now the loom frame is basically completed and you are ready to make the heddle.



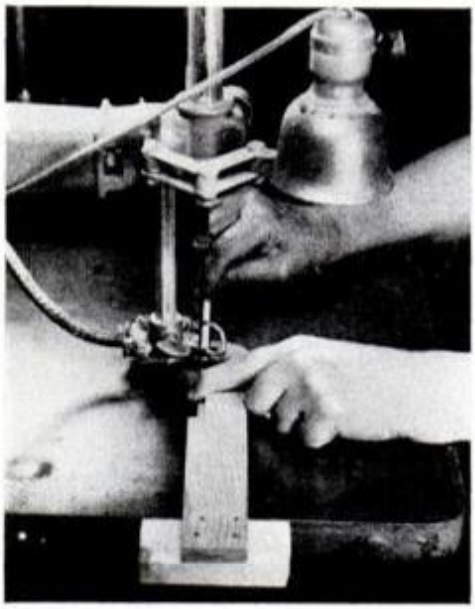
4 **Plugs to form the warping** and up-shed positions are glued and fitted into the heddle block.



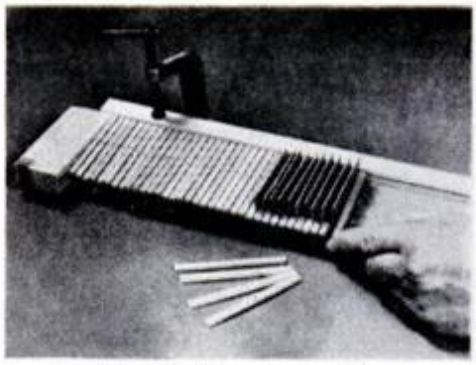
5 **A screw** is driven in the pilot holes running through the heddle blocks and into the side bars.



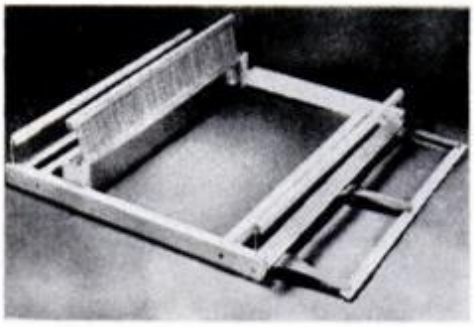
6 **A screw hook** is fitted into the warp beam. Cross braces will be attached for complete frame assembly.



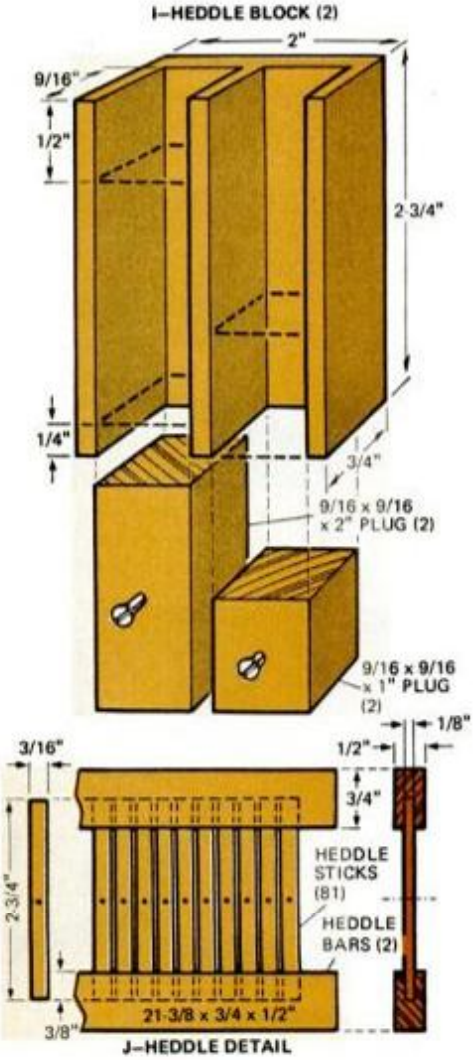
7 **A jig** makes cutting heddle strips to matching lengths much easier. One can also be used to drill holes at identical locations through the strips.



8 **Cardboard strips** are used to space the heddle sticks evenly in the dado of the heddle bar.



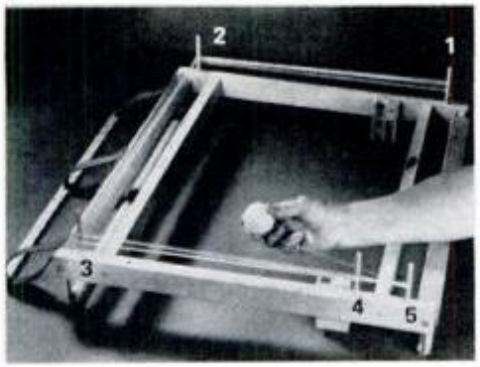
9 **The loom is assembled** and the heddle is placed in the up-shed position. For warping it is placed in the back slot.



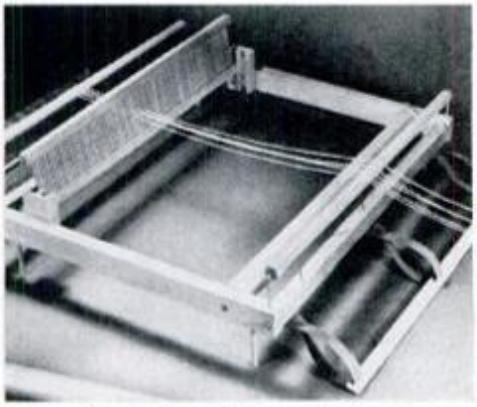
Heddle

The heddle holds the warp threads in position. To make it cut the heddle bars 21⅜ x ¾ x ½ in. (Fig. J). Make dado cuts for the heddle sticks as indicated. The sticks (there are 81) are 2¾ in. long. However, they should first be cut longer, then carefully trimmed to size. Begin by cutting strips 3/16-in. wide and ⅛-in. thick, using a hollow ground blade in a circular saw for smooth edges. Use a fine blade in a jigsaw to cut the sticks to their 2¾-in. length. A jig for cutting (Photo 7) is a good automatic measuring device for accuracy. Drill a 1/16-in.-dia. hole through

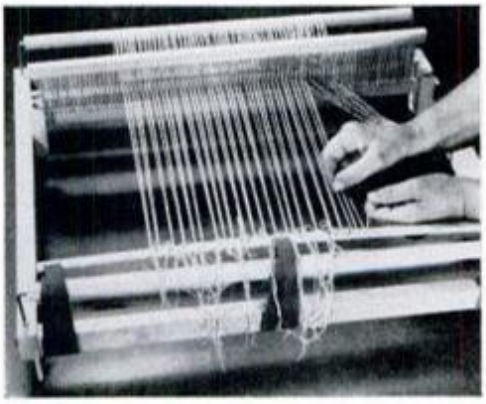
Материал, защищенный авторским правом



10 **The warp is made** by wrapping thread around pegs. This makes a 56-in. warp for over 30 in. of weaving.



11 **Beginning at the center,** one set of warp threads is passed through the heddle slits.



12 **When all slits and holes** needed are threaded, warp threads are tied to the tie bar in groups of four.

the center of each stick, again using a jig for accuracy.

Glue the ends of the sticks into the dado of one of the bars. Place the first strip ½ in. from the end of the bar. A number of spacer strips cut from heavy cardboard (approximately 1/16-in. thick) and slipped between the sticks as they are glued into the dado will assure even spacing and parallel sticks (Photo 8). Mark the center stick. After a few minutes the glue will be set enough that you can move the cardboard ahead in the gluing sequence. When all sticks are glued into the dado of one bar, spread glue into the dado of the other bar. Then, beginning at one end, work the free ends of the sticks into the second bar dado.

K—A SET OF WARP THREADS

Now the loom is completed and your weaving fun begins. Photo 9 shows the assembled loom with the heddle in the "up shed" position of the heddle block. In this position, it's ready for weaving.

Weaving the wall hanging

Our wall hanging was made by the tapestry form of weaving. In tapestry weaving, the weft threads are beaten down with a tapestry fork so they completely cover the warp, making a dense, rich surface. To make the wall hanging and other patterns, yarns of different colors pass part way across the loom, meeting in a tapestry slit join. This means there will be slits wherever two colors meet.

The secrets of successful weaving are keeping an even and tight tension on your warp yarns; keeping your selvedges straight (it's easy to let them pull in by not leaving enough yarn to beat down); and beating in the yarns evenly.

To weave the wall hanging pictured you will need the following yarns (symbols noted are those found on the wall hanging pattern; your yarn supplier can help you with unfamiliar terms): 350 yards white cotton warp yarn; two lightweight weaving yarns in different shades of blue (darkest blue, ×, and next darkest blue, ▲); one lightweight weaving yarn in light blue, +; one blue/brown Irish tweed yarn, □; two mohair yarns (a royal blue, O, and a light blue, •); one gray rya yarn; one brown thick and thin yarn; two thick boucles (one white, one in blue ombre stripes, ■). You will also need at least four shuttles and a tapestry beater (a table fork works well).

Start by measuring your warp as follows and stringing it to the loom.

Winding warp sets

Begin winding warp sets by first turning the loom upside down and inserting five pegs in the holes (Photo 10). Tie the white cotton warp yarn to Peg 1. Bring the thread from Peg 1 outside around Pegs 2 and 3, inside of Peg 4, outside and around Peg 5 in a figure eight, then outside the other pegs back and around Peg 1 for the first wrap. Continue wrapping in this way until there are 5 complete wraps—10 threads. This is a set. Wrap the free end of the thread around Peg 1 several times to keep it taut.

Use a short length of contrasting thread to tie the set at the cross over of the figure 8. Also tie the set between Pegs 2 and 3. Cut all the threads where they wrap around Peg 1. Remove the set, and hang it over the back of a chair. Make 17 more sets to warp the loom for the width of the wall hanging.

Stringing the loom

Turn the loom over again to string it. Mark the center hole of the heddle. Set the heddle in the warping position of the heddle block, the slot with the 1-in. plug. The proper warping and weaving position is with the rear take-up end farthest from the weaver, the cloth beam directly in front.

Slip the loop of one set of warp threads over the hand (Fig. K). Remove the contrasting tie thread. Lift the top loop off your hand and pull the double warping thread from the set. Pass the loop through the heddle slit to the left of the marked heddle stick and pull the thread through until it is about 1 in. beyond the rear warp beam (Photo 11). A steel crochet hook, size 6 or smaller, can be used to pull threads through.

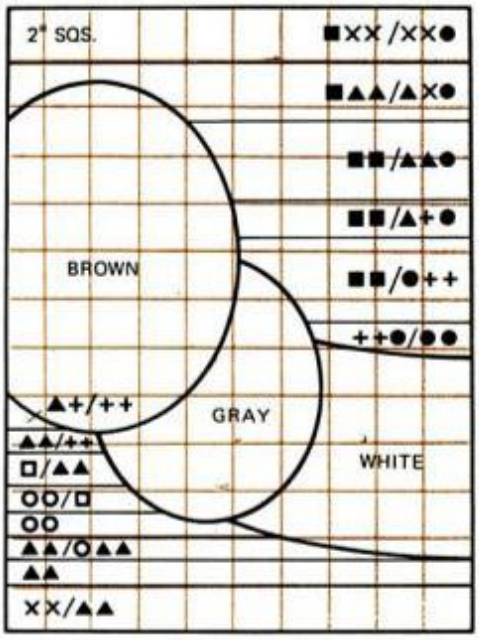


Fig. L. Fill shuttles with the number of strands and colors noted. Where there's a slash, fill two shuttles, one for each side, and weave every other row alternating shuttles. For colors, × denotes darkest blue; ▲, next darkest blue; O, royal blue mohair; □, blue/brown tweed; +, light blue; •, light blue mohair; ■, ombre boucle. Use one strand on others.

Continue lifting the threads off your hand and threading through the slits to the left until the set is used. Beginning with the first one threaded, slip the loops over the lock strip which has been removed from the back take-up beam, work the loop to the center of the strip and slip on the others in sequence. This will keep the threads from slipping back out of the slits as you warp.

Place a second set of threads over your hand and continue as before, this time working to the right of the center. Continue warping, alternating the side of threading with each set until all threads are used, with an equal number of threads on each side of the center. Move to the opposite end of the loom, spread the threads evenly along the lock strip, being sure that none crosses over another. Slip the pegs of the lock strip into the corresponding holes of the take-up beam to hold the threads in place.

Have someone help wind the warp threads onto the take-up beam. Any tangles in front of the heddle can be combed out with your fingers. Separate the warp threads into two groups and grasp one with each hand, being sure the tension is even on all threads. Your helper can slowly turn the warp take-up beam to wind the threads while you maintain a firm grasp and even tension on all threads in front of the heddle. Leave enough length of thread unwound to tie to the cloth beam tie bar. You're ready to thread the holes in the heddle.

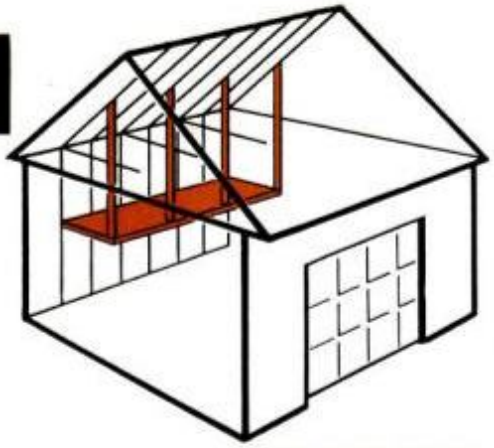
Threading the heddle

Beginning at the right side, pick up two threads running through the first slit. Pull one thread back through the slit but hold onto the other to keep it in the slit. Thread the free warp thread through the hole just to the left of the slit it was in. Continue rethreading one thread of each group of two into the holes to the left of each slit until all holes and slits are filled.

Starting at the left, pick up the first four threads and bring them towards you in a straight line. Bring them over the tie bar, around and up the back, separating them into

(Please turn to page 136)

Easy-to-build garage space-saver



Put an end to clutter in your garage with a storage platform. You can build it level with the top of the wall or a few feet down for extra storage. Either is a low-cost way to add "floor space."

This simple framing system offers extra 'floor area'

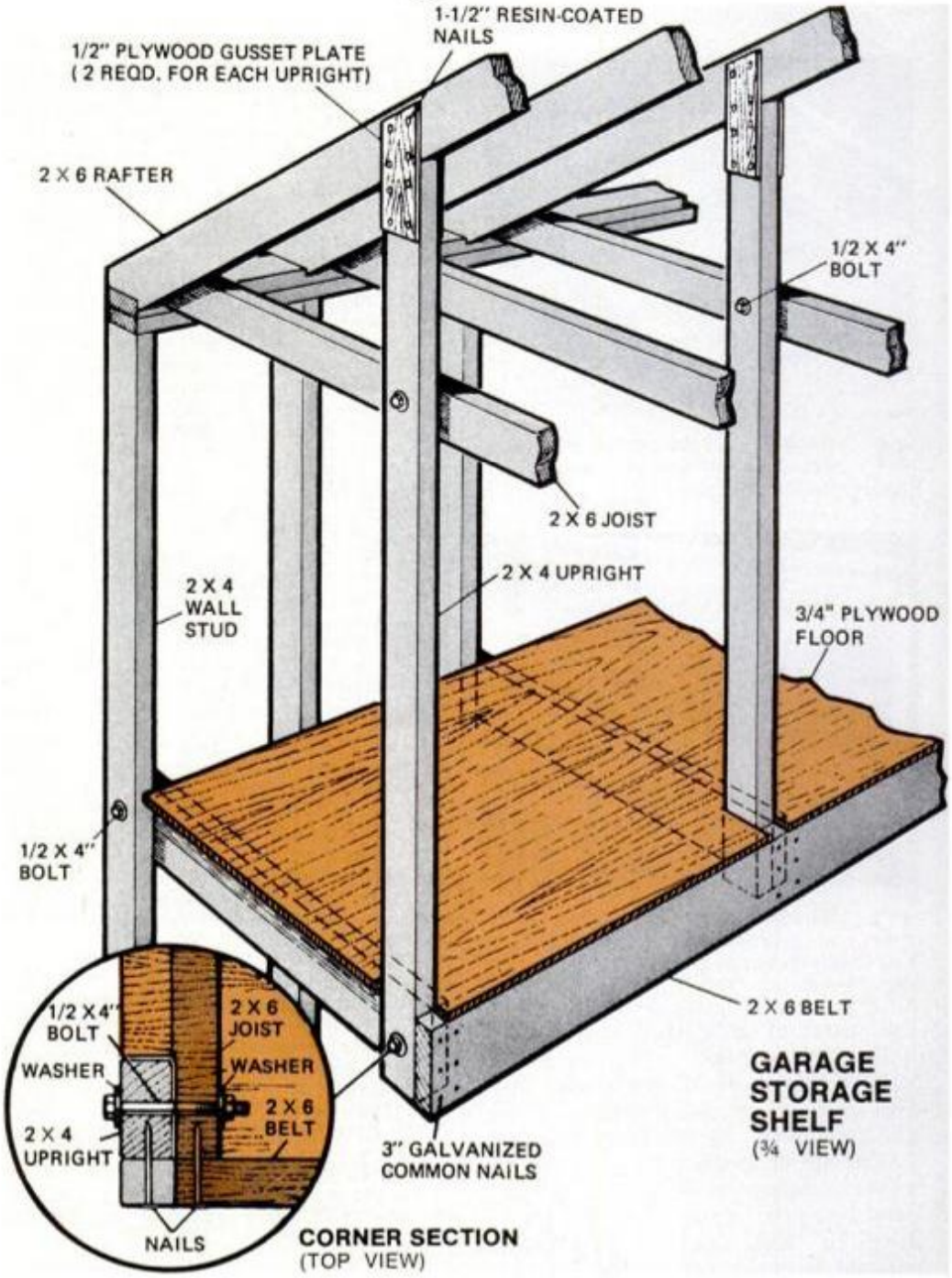
Has your garage gradually turned into just a storage barn? Well, here's an easy way to add enough storage space so you can clear an area to park the car. This project requires only minimal carpentry experience, no special tools, and all materials are stock items.

Plan for materials

Count the studs along the wall where your platform will be located. For every two studs you'll need one length of 2x6 for the floor joist, one 2x4 upright to connect the joist to the rafter, two ½-in. plywood gusset plates (figure about 3½ x 10 in. for each) to attach the upright to the rafter, and 7/16 x 4-in. bolts with washers.

Once you've picked the location, mark a level line across the wall studs where the 2x6s connect. Then measure 4 ft. along each sidewall to allow for the plywood platform. Using a level, carry this mark up the wall until you reach the rafter. **Tip:** If you make careful measurements along the outside walls, you can mark all the rafters and studs accurately by snapping a chalkline held between your measured marks.

Here's how to figure the right lengths for the joists and uprights. For the joists you have to allow 3½ in. for bolting to the wall stud, plus 4-ft. under the plywood platform, less 1½ in. under the platform for the run of the 2x6 belt. Total length: 50 in. The length of the uprights will depend on where you mount the platform. Measure from your mark on the rafter to the bottom of the 2x6 joist and remember to allow for the angle cut where the upright and the rafter meet. The only other piece of framing you'll need is a single length of 2x6 for the belt. It stiffens the assembly and supports the outside edge of the plywood between the joists.



Building the platform

After cutting your materials to the proper lengths, attach the joists to the wall studs. **Tip:** Tack the joist in position and clamp it. Then drill through both pieces (the hole alignment is automatically correct) and install the bolt. This procedure can be used at every bolted joint.

Make the angle cut on your uprights and then nail the gusset plates to them. Spot a few nails on the free ends of the plates. This way, as you raise the upright to your mark, the plates sandwich the rafter and you can lock the joint easily. A coat of a preservative like Woodlife will help keep the platform in good shape. ★★★

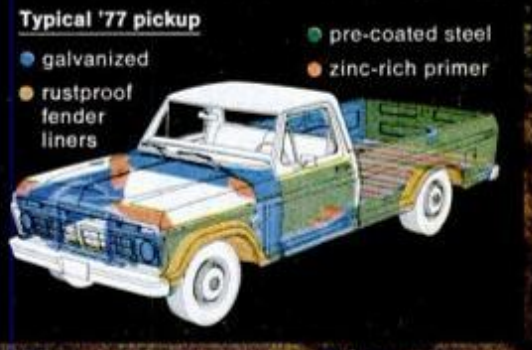
Материал, защищенный авторским правом

The tough ones get tougher. '77 Ford pickups.

You know Ford pickups. They're the ones with exclusive Twin-I-Beam, all-welded Styleside box—and a great record for durability. Now they're built even tougher.

New high-efficiency V-8's

New 351 and 400 V-8 options—designed for extra reliability.



New rust protection

Over 350 sq. ft. of anti-corrosion coatings like galvanizing. Plus new rustproof fender liners.

Built Ford Tough

93 out of 100 of all Ford trucks registered over the last 12 years are still on the job.

FORD

FORD DIVISION

2 GREAT
STARS
FOR
STYLE
PERFORMANCE
VALUE

McCREARY
ROAD STAR 60

This series 60 Road Star is a big, good looking tire with raised white letters and checkered flags. It has two fiber glass belts and two polyester cord plies for good handling. Tread has 9 running ribs for long mileage plus over 2000 sipes for tremendous traction.

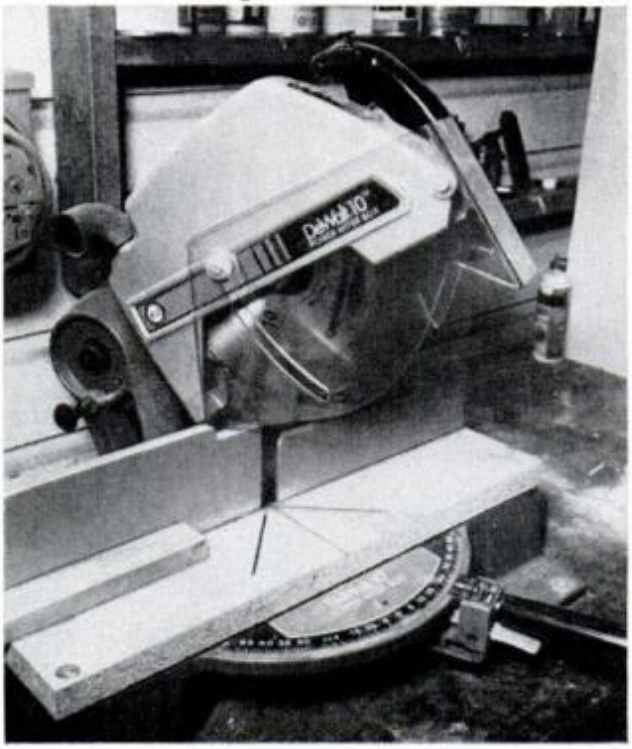
McCREARY
ROAD STAR

This series 70 Road Star has all the attractive features and construction of the Road Star 60. In addition McCreary offers radial, belted/bias and bias ply tires. We also manufacture tires for vans, recreational vehicles and light and heavy trucks.

McCREARY
Tire & Rubber Company
Indiana, PA 15701
QUALITY MANUFACTURER SINCE 1915

PM TOOL TEST

DeWalt's power miterbox



Specifications
Motor: 10.5 amp., 1.5 hp
Table: 4 x 21¼"
Weight: 34.5 lbs.
Arbor: ⅝" dia.
Blade: 10" dia.
Speed: 5500 rpm
Height capacity: 3⅝"
Width capacity: 4¼"
Price: $239.95

Special features
One-hand power safety
Auto-electric brake
Clear blade guard
Rear sawdust ejection
Miter to 47° each side
Gear-driven motor
¼° vernier scale

DeWalt's 10-in. power miterbox is a specialized tool. You can adjust the blade from 47° right to 47° left on a vernier scale that's marked off in ¼° increments.

The scale reaches to 47° at each end to allow mitering out-of-square corners. This amounts to an easy-to-use, powered mitering system with accurate and versatile adjustments. But don't overlook the 0° setting. The 10-in. blade with straight down cutting action has the capacity to crosscut 2x4s. So the miterbox is also an effective cutoff saw. The tool is portable but can be bolted to a benchtop through its metal base.

I found the tool has more than adequate power for cutting up to its capacity. The blade chatters somewhat as it starts up so you have to wait about two seconds for the full rpm level before cutting.

The feature that impressed me the most is the trigger lockout button. You can't accidentally start up the saw unless it's pushed down and the convenient location makes it easy to depress as you squeeze the trigger. You can remove it when you're done working to prevent unsupervised operation.—*Mike McClintock, Home and Shop Editor*

Release the pivot grip lever to swing the saw to five positive stops: 0°, 22½° and 45° right and left. Twist the handle to lock settings in between.

A safety release button is built into the handle. You can't depress the trigger unless this button is down. The button is removable to effectively lock the saw when you're not around.

Материал, защищенный авторским правом

Henry Morgan says:

"THE APPLIANCE REPAIR FIELD COULD SURE USE SOME GOOD MEN, NOW."

If you've seen this well-aged comic on television, you know I'm not in the business of fixing appliances. So what am I doing in an ad for an appliance repair course? It's simple: I got tired of laying out a sockful of money every time something went wrong around the house. Then I came across an NRI ad and I thought, "Why not? I've spent a fortune on repairmen . . . if I'm too stupid to fix a toaster, this is the way to find out."

So I took the course and now I can fix my own appliances and I can even make money out of it if I want to. As a matter of fact, there's enough money in fixing these things, I'm tempted to quit show business and go straight.

Think I'm kidding about the money? Just check out the receipts on your last repair bills. And then ask anybody if they know a good reliable repairman. You'll find they're scarcer than doctor who make house calls. If there ever was a field crying for good men, this is it. Opportunity is knocking louder than my car's engine, and it could be knocking for you.

If you've ever toyed with the idea of making it on your own, with your own repair business . . . NRI has a low-cost, home study plan that really makes sense. You can hang in there with your present job while you're learning; and you'll find NRI's course is quick and easy.

Let's say you have trouble just plugging in your electric shaver. You'd better start with the basics . . . and the NRI course starts right there. First, they tell you what electricity is, and you can't get any more basic than that. They take you by the hand, step by step, as fast or as slow as you want to go. If you get an attack of the stupids, there's always an NRI expert waiting to give you a hand. They do everything but turn the pages for you.

Like I say, I took the course and it turned out to be even better than they said it would be. Sure they pay me for writing this ad, but it ain't much, believe me. I could make more in a month by fixing things for the neighbors . . . and I'm not kidding. It's just that I believe in seeing guys make it on their own. If you follow the simple texts and the big pictures, you can be a technician in no time. They even send you a professional appliance tester with the course.

You don't have to stop with toasters and irons. They'll even show you how to repair air conditioners, refrigeration units, commercial appliances and power tools. That's where the big money is.

Take Henry's advice and send in the coupon. It's nice to find out you've got some hidden talents. And you'll save a bundle . . . or make it . . . or both.

Send For This Free Full-Color Book and See What NRI Can Do For You.

Henry Morgan

Henry Morgan

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

Send me your free book in Professional Appliance Servicing. I understand there is no obligation, and no salesman will call.

Approved under GI Bill if taken for career purposes.
☐ Check for details.

Name _____ Age _____
(Please Print)

Address _____

City _____ State _____ Zip _____

A National Home Study Council Accredited School. 600-027

Direct From The Factory To You At Fantastic Savings!

Model 120
Solid ¾" Black Walnut
74" x 16¾" x 10"

EMPEROR CLOCK COMPANY'S

MOST POPULAR MODEL 120-K

DO-IT-YOURSELF CASE KIT

SOLID 3/4" BLACK WALNUT

104.50 FACTORY DIRECT SALE PRICE

When purchased with movement (extra). Or, case kit alone $114.50. Reg. $149.50.

Build this beautiful grandfather clock, complete with Westminster chiming movement-Tempus Fugit Dial, for just $219.00. Add $15.00 for Moving Moon Dial (as shown). Compare your finished clock with those retailing at $850.00 and more.

BUILD A GENUINE EMPEROR . . . SAVE HUNDREDS!

Now you, like our thousands of satisfied customers, can build and enjoy your own beautiful grandfather clock for a fraction of what it would cost retail. Emperor Clock Company, the world's leading and best-known manufacturer of grandfather clocks, will save you hundreds. Because, at Emperor we buy raw lumber in tremendous quantities at lower prices and pass the savings on to you. Plus, we own and operate one of the largest, most efficient woodworking plants of its kind in the country.

Emperor's classic Model 120-K do-it-yourself case kit in solid ¾" kiln-dried black walnut is now on sale for just $104.50 . . . $45.00 below our already low factory direct price. Compare its features to grandfather clocks costing four times as much! It has four full-turned hood columns, divided swan neck with decorative finial, deep-carved moldings, full-length waist door, built-in floor levelers, deluxe brass-finished hardware and more.

IT'S EASY TO BUILD AN EMPEROR GRANDFATHER CLOCK!

There's no guesswork involved with an Emperor grandfather clock case kit. For accurate and easy assembly, each kit piece is pre-cut and sanded smooth on both sides. All miters pre-cut at no extra charge. (For those who prefer, kits may be ordered unmitered.) Divided swan neck and finial, waist and dial face doors, dial frame and basefront are pre-assembled. Complete, illustrated, easy-to-read assembly instructions included. No woodworking experience or special tools necessary. Each piece may be reordered separately.

MONEY BACK GUARANTEE

If for any reason you are not completely satisfied, return in original shipping carton within 30 days for prompt refund . . . no questions, no excuses.

EMPEROR® CLOCK COMPANY
WORLD'S LARGEST MANUFACTURER OF GRANDFATHER CLOCKS

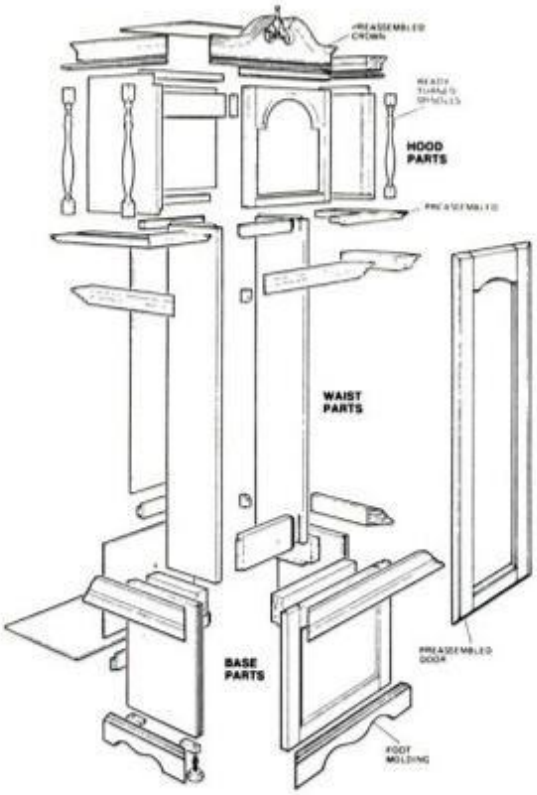
1977 Emperor Clock Company

ACT NOW! OFFER ENDS MAY 31, 1977

Материал, защищенный авторским правом

EMPEROR MOVEMENTS AND DIALS FOR MODEL 120-K

Made in West Germany of Solid Brass



EASY TO ASSEMBLE

Emperor Model 100-M movements, manufactured by a fourth generation of West German clocksmiths, are made to our rigid specifications from the highest quality solid brass, with pinions of hardened steel. Fully assembled movements include weights, solid brass weight shells, brass bob, pendulum and chimes.

Model 100-M movements have two sets of musically-tuned rods. One set sounds the historic Westminster chimes: four notes on the quarter-hour, eight on the half-hour, twelve on the three-quarter-hour and sixteen on the hour. The other set sounds a Big Ben tone on the hour.

Emperor dials are also manufactured in West Germany by a renowned dial-making firm, famous for their solid brass craftsmanship. There are two dial versions of the 100-M movement: Tempus Fugit (Time Flies) and Moving Moon with classic lunar calendar. Both are solid brass and brush-finished with black serpentine hands. Antiqued filigree spandrels frame the dial ring which has black Roman numerals.

Because each movement bears the Emperor name, it is thoroughly tested in our quality control room before it is shipped to you. We proudly stand behind our name 100%. Emperor West German movements and dials are known and valued everywhere for their lasting accuracy and dependability. Don't risk buying anything less.

Installation and adjustment is a simple operation following the step-by-step instructions supplied.

EIGHT DAY WEIGHT DRIVEN WESTMINSTER CHIMES

A. 100-M Movement with Tempus Fugit Dial $114.50

B. 100-M Movement with Moving Moon Dial $129.50

MOVEMENT CARRIES A ONE YEAR WARRANTY

MAIL ORDER AT ONCE! OFFER ENDS MAY 31, 1977

USE THIS FORM TO ORDER FACTORY DIRECT

ALL ORDERS SHIPPED 2 TO 3 WEEKS • SHIPPING CHARGES COLLECT

EMPEROR CLOCK COMPANY, DEPT. 39-P
Emperor Industrial Park, Fairhope, Alabama 36532

Please check: New Customer ☐
Previous Customer ☐

QTY.	DESCRIPTION	WEIGHT	FACTORY DIRECT REG. PRICE	FACTORY DIRECT SALE	EXTENSION
	Please send kit unmitered ☐				
	Model 120-K Solid ¾" Black Walnut Do-It -Yourself Case Kit with purchase of either movement (priced separately) below	49	$149.50	**$104.50**	
	Model 120-K Solid ¾" Black Walnut Do-It-Yourself Case Kit without purchase of movement (priced separately) below	49	$149.50	**$114.50**	
	Model 120-A Solid ¾" Black Walnut completely finished clock with Tempus Fugit Dial, Westminster Chimes	95	$399.50		
	Model 120-A Solid ¾" Black Walnut completely finished clock with Moving Moon Dial, Westminster Chimes	95	$414.50		
	Model 100-M Movement complete with Tempus Fugit Dial, Westminster Chimes for Model 120-K	33	$114.50		
	Model 100-M Movement complete with Moving Moon Dial, Westminster Chimes for Model 120-K	33	$129.50		

We accept personal checks
ENCLOSED $_____ CHECK ( ) MONEY ORDER ( )
CHARGE TO MY ( ) MASTER CHARGE ( ) BANKAMERICARD
ACCOUNT NUMBER

Master Charge Inter Bank No. (above your name) — Expiration date required Mo. Yr.

TOTAL $_____
Alabama residents only, add 4% sales tax $_____
GRAND TOTAL $_____

Please send free color brochure ☐

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

master charge — BANK AMERICARD

VISIT OUR FACTORY SHOWROOMS MON.-FRI., 8 A.M. TO 5 P.M., EMPEROR INDUSTRIAL PARK, FAIRHOPE, AL.

South Carolina. It's a lot of great vacations.

Whatever kind of vacation you're looking for, you'll find it in South Carolina.

And to help you plan your vacation, we'll send you the new South Carolina Trip Kit—free! It'll tell you about things to do and places to stay. And there are maps to show you how to get there once you get here.

Wherever you go in South Carolina, you'll find a lot of great vacations. Just clip the coupon to find out how they can all be yours.

FREE SOUTH CAROLINA TRIP KIT

Name _____

Address _____

City _____ State _____ Zip _____

South Carolina Division of Tourism, Room 461, Box 78, Columbia, S.C. 29202

Celestron® Multipurpose Telescopes

On Display at Museums and Planetariums Throughout the Country

Squirrel at 70 ft. Celestron 5

Jupiter. Celestron 8

Trifid Nebula. Celestron 14

The Choice. Three reasons why experienced telescope enthusiasts and leading colleges, universities and science centers the world over repeatedly select Celestron telescopes:

The Celestron 5. A tabletop observatory for exploring the Moon, planets, scores of open star clusters and gossamer nebulae at up to 300X. For casual observing or telephotography, rest the instrument on any flat surface, swing up the tube and focus. Close in on the whiskers of a squirrel at the near focus of 20 ft. or the face of a friend at half a mile. The 3½-lb. tube demounts for hand-held shots at 25X. (Size swung down: 7" x 8" x 16", Wt.: 12 lbs., Base price, including electric star tracker and automatic star locater, **$595**)

The Celestron 8. Eight full inches of aperture make this portable observatory in a suitcase the amateur's favorite for studying the surface features of Mars, the subdivided rings of Saturn, the ever-changing belt structure of Jupiter, the intricate filamentary detail of deep-sky nebulae, the central regions of globular clusters at up to 500X. Also the ultimate terrestrial telescope or telephoto! (Size swung down: 9" x 12" x 22", Wt.: 23 lbs., **$790**)

FREE COLOR CATALOG

The Celestron 14. The appeal of this prestigious, fully electric dome instrument is enhanced by a unique design that also makes it the world's largest one-man-portable. Demount and load it into your compact car in five minutes! Within range of the Celestron 14, at up to 850X, are the delicate contrast levels of the diffuse and planetary nebulae, the spirals of remote galaxies, and the quasars. (Size swung down: 18" x 22" x 44", Wt.: 108 lbs., $3,750)

Celestron International 2835 Columbia • Box 3578-E • Torrance, CA 90503

World's Leading Manufacturer of Compact-Portable Telescopes

WORLD'S OUTBOARD CHAMPION

(Continued from page 97)

at a "moderate" 6500 rpm as I got the feel of the boat.

Steering was firm but torque minimal, and the hull took turns with a remarkable stability—no sensation of tricks or a tendency to break loose or trip. My chase boat reported that at my conservative trim setting the planing angle looked good, so on downwind runs away from the gusts I pushed down on the right-foot accelerator and the hull skimmed forward as the rpm touched 8200—about 120 mph. The hull was a flying machine; it was easy to see why Mercury had contracted Angelo Molinari for all his handbuilt hulls.

Blow-over at start of a race at Miami catches Fountain (center) in spectacular crash that flipped three boats at once.

The techniques

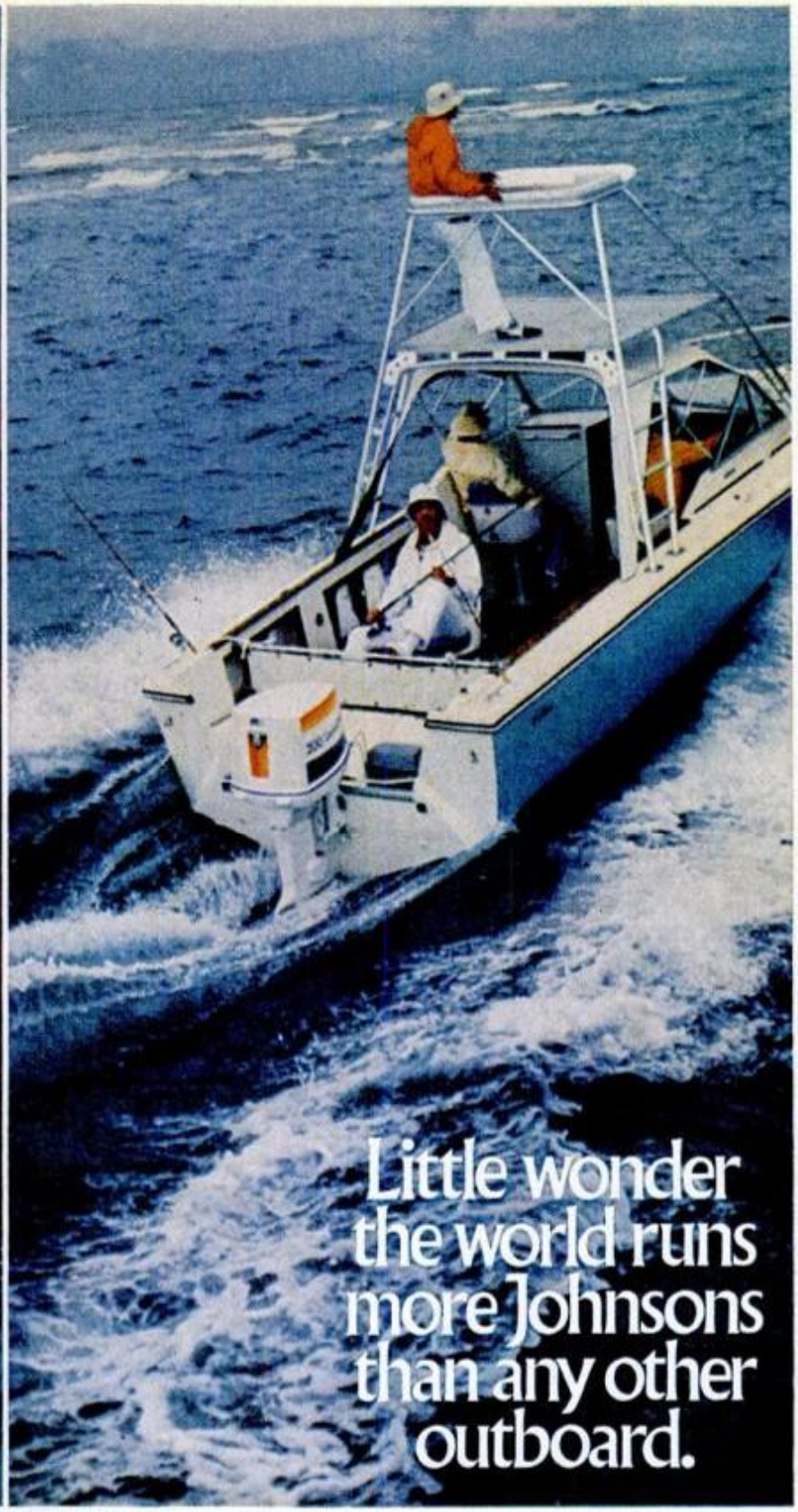
It takes more than a fast boat to win, so I asked Reggie about the other tricks that keep his remarkable machine out in front. Precise starts come with practice, and are crucial, he noted. A slower boat that can accelerate into the first corner may force a faster one into a wider slot and hold him off until the finish. Lying behind a lead boat and "drafting" won't work in a race with a surfacing prop throwing a roostertail astern while the lead boat takes the clean water. Cutting in too close can lead to disaster; if one boat starts to kite and flip it can blow over any others nearby. Staying in top condition, Reggie believes, has helped keep him from serious injury from some bad speed-flips.

Reading water conditions ahead and feathering off speed to cross "rhythm water," judging planing angle while "riding the edge," studying other drivers and watching them with peripheral vision, carrying speed into a corner until the last second and then reaccelerating fast are among many special skills making a winner.

Learn them as well as Reggie Fountain has; use them to win every time, and you may make a factory team. Then drive outboards at speeds unheard of until a year or so ago and possibly you can challenge a champ. That's all there is to it. ★★★

Материал, защищенный авторским правом

Johnson's V-6s. You're looking at the world's most powerful outboards.



Little wonder the world runs more Johnsons than any other outboard.

Last year, our 200 hp V-6 was a giant step forward in outboard performance for big offshore cruisers and muscle boats. So this year we've added a 175 hp version for more boaters to step up to V-6 performance.

Performance starts with a full 90° V-6 design that provides a barrel-chested 149.4 cubic inches. So the engine gives you outstanding thrust for getting on plane fast...doesn't have to breathe hard to let you cruise faster at a fuel-efficient, part-throttle setting than smaller motors pushing comparable boats at full speed. And at cruise throttle, both of our V-6s give surprisingly good fuel economy.

Though powered like tigers, our V-6s handle like pussy cats. Built-in power Trim'N'Tilt gives you finger-tip control of motor tilt for launching/beaching and of boat trim while running. And our accessory remote single-lever Command Center™ gives you one-hand control of power from start-up to all-out.

If you "run away" to sea often, consider our V-6 versions with 25-inch, extra-long shafts for higher stern freeboard. But whichever Sea-Horse® motor you choose, you'll get a true "salt water" outboard—all Johnsons are built to resist corrosion inside and out. See them at your Johnson dealer, or write for free catalog. Johnson Outboards, Division Outboard Marine Corporation, 2732 Sea-Horse Dr., Waukegan, IL 60085.

Under Outboard Motors

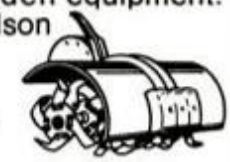
First in Dependability
Johnson
OUTBOARDS

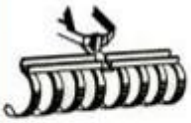
Материал, защищенный авторским правом

Gilson
BIG POWER

And a good buy!

Looking for a rugged tractor at a reasonable price? Gilson dealers offer you any of four 16 hp models in hydrostatic, or gear drive, for hundreds of dollars less than competitive models. But don't let the low cost fool you . . . they're ruggedly built with an all welded contour frame from front to rear for rigid strength. The patented unitized engine/frame design adds structural strength and reduces vibration, helps keep the power train and attachment power drives in alignment. Choice of 22 attachments including side and rear discharge mowers and tiller attachments and a complete line of other yard and garden equipment. See your Gilson dealer or write for information.





Gilson

Please send tractor information and name of my Gilson dealer.

Name _____

Address _____

City _____

State _____ Zip _____

Gilson Bros. Co.
P.O. Box 152PM
Plymouth, WI
53073

 (Continued from page 110)

and holes with wood putty or other filler. Then prepare the entire wood surface for the final finish.

Sanding: Begin sanding with the smallest grit, the finest paper, capable of smoothing the wood. For rough sanding on raw wood, begin with 80 to 100-grit aluminum oxide, open-coat abrasive paper. If the raw wood is already fairly smooth, begin with 120 to 220-grit aluminum oxide, open-coat paper. Between finish coats use 3/0 steel wool. You'll find that a tack rag to pick up the dust and wood particles is invaluable.

Staining: A matter of personal preference, staining is a cosmetic step not really necessary for protecting the wood. There are four main types of stains: oil, water, non-grain-raising and spirit.

Oil stains are most common for home use, although wood can take this stain unevenly. You can prevent uneven shading by applying a diluted sealer coat or diluted coat of the final finish (diluted by five parts of its solvent) before staining. Apply stain with a brush in even coats. Remove the excess with a cloth and be sure it's dry before proceeding.

Sealing: To prevent the final finish from being absorbed into the wood

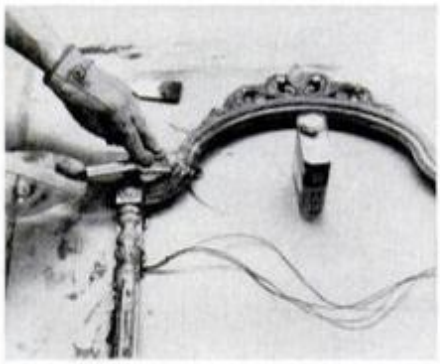
(Please turn to page 134)

MIRROR

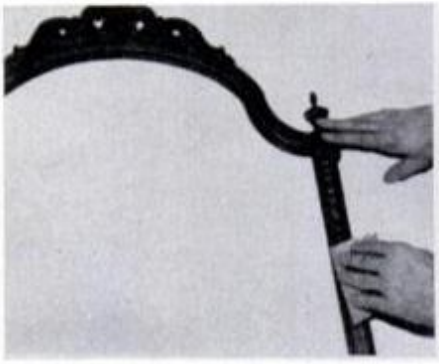
When we found the handsome old walnut mirror shown at the beginning of this article, it was painted a lackluster gold. Imperial Wonder-Paste, a jelly-like liquid, was used to strip the paint. Then we sanded the wood smooth with coarse, medium and fine grades of sandpaper.

Walnut is a porous wood, so we used a wood filler made by Mohawk to fill the pores. You add benzine to the paste until the mixture reaches a consistency of heavy cream. Then apply it with a cloth and allow to dry about five minutes (it will cloud slightly). Rub the excess filler off by working with and across the grain, and allow the wood to dry for 24 hours.

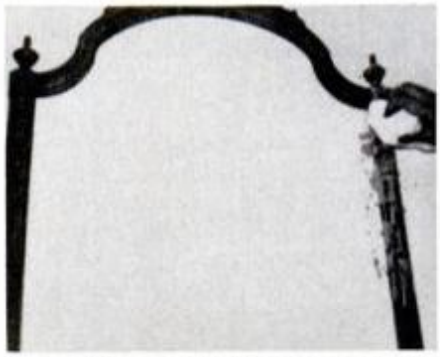
Next we applied "Qualasole," a padding lacquer finish with a cotton pad (hence the name "padding lacquer"). The pad is dipped in lacquer which is dispersed throughout the pad by a tap of the palm. The lacquer is padded on in short, quick strokes, working with the grain. It took 20 minutes drying time between the first three coats and two hours between the next two coats.



1. Stripper is applied to the frame by Kipp Gosewehr at John Harra Woodworking Studio to remove paint.



2. The wood is sanded with 120, 180 and 400-grit sandpaper to smooth the raised wood caused by stripping.



3. A mixture of filler paste and turpentine is applied to the mirror frame with a cloth. It clouds as it sets.

4. A pad of cotton cloth wrapped in cotton cloth held by rubber bands is used to apply padding lacquer.

Материал, защищенный авторским правом

You can be successful in the Air Force

In more ways than one

What does success mean to you? The chance to learn and grow? A well-paying job? Serving your country? Making new friends? No matter how you define success, the Air Force offers you many ways to achieve it.

If you're a high school graduate, we offer active duty as an Airman. It's a good chance to train and learn a valuable skill through on-the-job training or at one of our excellent Tech Schools. Or you can continue your off-duty education in a Community College of the Air Force program. You can earn a good salary, 30 days of paid vacation a year, and promotions which lead to more pay raises.

If you're college-bound, the Air Force Reserve Officers Training Corps (ROTC) offers a variety of scholarships. The ROTC scholarships cover most costs and also provide a tax-free monthly allowance of $100.

Also for the college-bound man or woman, we offer the Air Force Academy. It's a tough 4-year education but one of the best—with all expenses paid. And it leads to a commission as an Air Force Officer when you graduate.

You want just a part-time job? Look into the Air Force Reserve. Our part-time jobs are hard to top. We offer expert training. A monthly paycheck. Plus the opportunity for promotion. And we ask for very little of your time in return.

Decide which area of the Air Force interests you most. Then decide if you're willing to meet our high quality standards. We need young people dedicated to making an already great Air Force even better. If you are interested in receiving additional information, call toll free 800-447-4700 (in Illinois: 800-322-4400) for the location of your nearest Air Force representative or send in the attached card.

AIR FORCE—A GREAT WAY OF LIFE

Материал, защищенный авторским правом

THOR INTERNATIONAL
Dept. PM, P.O. Box 91254
Los Angeles CA 90009
(999 N. Sepulveda—314)
(El Segundo CA 90245)

ORDER COUPON

Name _____
Address _____
_____

I want ____ Thormaster wrench(es)
Enclosed check☐ M.O. ☐ for $_____
Add $.98 shipping (CA residents add 6%)
Shipped with trial/return warranty.

Do you need a $65.00 *SEARS* wrench set or one **Thormaster** wrench for only **$4.85**??

Range: ⅛ to ⅞" or 9 to 22 mm.

Well, the fact is . . .

★ The **Thormaster** wrench replaces about 40 different wrenches. It combines ratcheting, box-end and crescent features into one *self-adjusting marvel.*

★ You can handle both inches *and* metric, or any type of nut (square, hex, winged, aircraft, etc.) even *damaged* nuts, without having to change wrenches or adjust for size.

★ **200 ftLb torque, 9 inches long, fits anywhere.** A must on jobs requiring different wrenches, for hobbyists, home repairmen, mechanics, boatmen, cyclists, etc. Highly praised by **MOTORCROSS ACTION magazine and others.**

LEARN GUN REPAIR

BIG PROFIT HOME BUSINESS

Learn at home in spare time. Ballistics, re-loading, accurizing, customizing, re-stocking. Send for free "Career Kit." No obligation. No salesman will call.

Guns Spoken Here

NAME _____ AGE _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Careers by home study **North American School of Firearms,** 4500 Campus, DPTPB017 Newport Beach, CA 92663

IF YOU CAN SING, WHISTLE, OR HUM A TUNE . . .

you can play the Musical Saw. No notes to read, no musical knowledge required. If you are 10 or 70, you play or no pay. Musical Saw, soft hammer, bow, resin and lessons mailed on 5 days' trial. Write today for details and free copy of "Sawing News of the World," picturing successful saw musicians. MUSSEHL & WESTPHAL, 107 Fort St., Fort Atkinson, Wisconsin. 53538.

Free Blackhawk Films Catalog...

Listing thousands of 8MM and 16MM silent & sound films . . . The most comprehensive listing of home entertainment films available . . . and it's yours free. just write or call today.

Call Toll Free: 800-553-1163
In Iowa Call: (319) 323-9736
Please mention order #3233

Blackhawk Films, Inc.®
3233 Eastin-Phelan Building
Davenport, Iowa 52808

GARAGE DOORS DIRECT FROM FACTORY

Write for our FREE catalog on Overhead Garage Doors, Electric Operators, and Radio Controls; featuring a section on how to frame an opening to accommodate an overhead garage door.

Catalog illustrates our model line of – Redwood Panel Doors
Panel Doors
Flush Doors
Fiberglass Doors
Pre-finished Doors

Easy contact through our toll free numbers:

Nationwide:
800-631-5656
New Jersey Residents:
800-872-4980

Ridge Doors
NEW ROAD
MONMOUTH JUNCTION, NEW JERSEY 08852

Please send me your free catalog

NAME _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____

FURNITURE REFINISHING

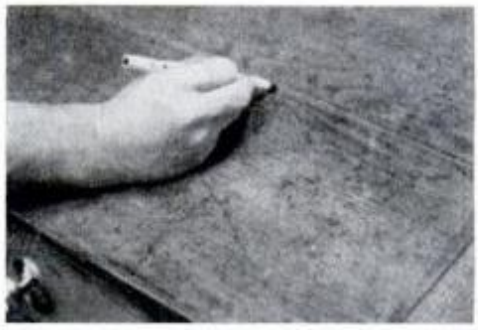
(Continued from page 130)

(except those penetrating finishes that should be absorbed), a sealer coat is applied to close the wood pores. Lacquer-based sealers are most commonly used. They are brushed on, allowed to dry, then lightly sanded.

Filling: Woods with coarse grain such as oak, walnut and mahogany require a filler, if you want a perfectly smooth finish. Fillers conceal pores so you can get a glass-like finish.

Now your piece is ready for the final finish. See page 117 for a chart of the final finishes you can choose and how to apply them. ★★★

You can steam out gouges and dents that later occur. Place a medium-hot iron over a damp cloth on the indented area.



Scratches that your finished piece receives can be treated with wax pencils available in wood colors.

After many years, the finish on your piece may need reviving. This dull finish was restored with Minwax Antique Oil.

Копирование запрещено авторским правом

Presenting the Bradley GT II. The Ultimate Achievement.

To own a classic European-style sports car is a satisfaction. To build the one you own is an achievement. Presenting the Bradley GT II. The ultimate achievement.

The Bradley GT II is widely acclaimed as the finest sports car kit in the world. Its sleek, low, windswept design elevates it to a styling level shared only by the most famous and expensive European models. Merged with this superb styling are performance characteristics which usher in an altogether new concept of speed, comfort and control. And because the Bradley GT II car kit fits over a Volkswagen chassis, you enjoy the dependability and economy of the world's most popular German automobile.

Here is quality beyond compare. To build one...to own one...reflects a unique life-style few are privileged to enjoy. Bradley GT II. The ultimate achievement.

Send $1.00 for the 4/color Bradley brochure, write Bradley, 495 Shelard Plaza, 400 County Road 18 South, Minneapolis, Minnesota 55426.

Bradley Automotive PM-2
495 Shelard Plaza, 400 County Road 18 South
Minneapolis, Minnesota 55426

- ☐ Send $1.00 for Bradley GT-I & GT-II brochure
- ☐ $7.00 for Bradley GT-I Assembly Manual
- ☐ $25.00 for Bradley GT-II three dimensional structural plans

Name _____ Age _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____ Home Phone ( ) _____

The above materials may be charged to these credit cards: Bank-Americard, American Express, Diners, Carte Blanche and Master Charge.

Account No. | | | | | | | | | | | | | | | | |

Expiration date: _____

BRADLEY AUTOMOTIVE

495 Shelard Plaza, 400 County Rd. 18 South, Mpls, Minn. 55426

Материал, защищенный авторским правом

These 3 BIG DRAFTING KITS included...

when you train at home with us for a

Accredited National Home Study Council

GOOD PAY JOB IN DRAFTING!

Pick a career where the jobs and money are! U.S. Dept. of Labor reports drafting jobs are *increasing.* American Institute for Design & Drafting reveals *salaries are up 25%* in 3 years — predicts *shortage* of draftsmen. Prepare *at home, in spare time* for a rewarding career in drafting. It's easy with our exclusive step-by-step instruction. Everything furnished. It is *not* necessary to be high school grad.

RUSH COUPON FOR FREE KIT!

Mail coupon for **FREE "DRAFTING CAREER KIT", Drafting Aptitude Test,** including new **5-way Drafting Instrument** and 16-page book, **"Your Future in Drafting"** — ALL FREE. No salesman will call. **GI and VA Benefits.**

Careers by Home Study
NORTH AMERICAN SCHOOL OF DRAFTING, Dept. PB017
4500 Campus Dr., University Plaza, Newport Beach, CA. 92663
Rush "DRAFTING CAREER KIT," including Book, ALL FREE! Aptitude Test & Drafting Instrument—

NAME _____ AGE _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Revamp your van.

Spray away scrapes and scratches on vans, trucks and campers. With factory-matched Plasti-Kote/Easy Way Truck Colors. Get them in the automotive department or store.

plasti-kote

1000 Lake Road, Medina, Ohio 44256
Phone 216-725-4511

A CONSOLIDATED FOODS COMPANY
RESPONSIVE TO CONSUMER NEEDS

BUILD A LOOM FOR WEAVING FUN

(Continued from page 121)

two pairs of two threads each, one pair passing to the right, the other to the left of the set of four threads. Bring them up and tie into a square knot. Continue working towards the right, tying each group of four threads to the tie bar. Photo 12 shows the warping.

Next, lift the heddle out of the warp position of the heddle block and place it in the up-shed position in the heddle block to open the other shed. (For down-shed position move heddle directly in front of block.)

'Throwing' the shuttle

Wrap the colored yarn weft (filling) on the shuttle and begin to weave by passing or "throwing" the shuttle across the warp threads, and alternately placing the heddle in the up or down-shed position with each pass. The warp threads are tightened by turning the rear or front take-up beam, letting the ratchet stop fall into the ratchet teeth to lock in position. To loosen the warp when you're not weaving, turn one takeup beam just enough to allow the ratchet stop to be lifted and loosen the tension.

Begin work on your wall hanging by enlarging the pattern (Fig. L) to the full size (19½ x 26 in.) and place it underneath the loom to guide you in your weaving. Don't worry about following it precisely. Explore color combinations and shape variations as you go along and let your weaving become a one-of-a-kind creation.

You'll need a heading at the beginning of your weaving to space the warp yarns and make a surface to beat against. To do this, weave with rags for about an inch, beating them down straight and even against the bottom of the loom. Then switch to yarns.

Beating down the yarn

A lot of yarn gets beaten down in a tapestry, to cover the warp ends. Be sure to leave surplus yarn in each shed so your selvedges won't draw in, but not enough surplus so that parts of your weaving buckle.

The technique is to throw the shuttle across the shed and draw the yarn through diagonally, while one hand holds the yarn firmly at the selvedge. Starting at the selvedge the yarn is coming from, you'll pass the shuttle across the width of the loom. Then, starting at the same edge, beat the yarn down against the finished weaving. Excess yarn will slide across the loom and exit at the shuttle side. Check your selvedges often for straightness, and examine the weaving to see that warp is fully covered.

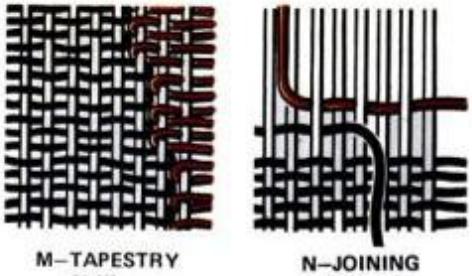
Begin with yarns by winding a double thickness of the darkest blue (×) onto a shuttle and pass or "throw" it across the loom, then beat it down. Change sheds and repeat, holding onto the selvedge edge where the yarn begins. Weave this color for several inches (the first inch will be turned under as a hem), then follow the pattern or mix your own colors. The second stripe, beginning on our pattern, involves weaving a row with the darkest blue, the next with the next lighter blue.

Joining yarns

You will need to join yarns whenever your shuttle runs dry, when you change colors, and when you are working tapestry slits (Fig. M). For changing colors or shuttles, leave a 5-in. tail on the old and new yarn ends. Join the new yarn so it overlaps with the old.

Continue weaving stripes straight across the loom until you get to the bottom of the white circle on your pattern. Then start using the tapestry slit technique (Fig. M), letting colors intersect in midloom to form the pattern.

For tapestry slits weave the first color across the shed to where you want it to stop. Weave the second color up to, but not intersecting, the first. Change sheds and turn each color around, making sure that no warp ends



M—TAPESTRY SLIT N—JOINING YARNS

Two ways yarn meets.

in the shed are uncovered. Slits are connected by moving one of the colors over an uncovered warp end. Try not to let slits get longer than half an inch before connecting them.

When you've woven 9 or 10 inches, loosen the take-up and warp beam ratchets. Cover the woven section with a sheet of wrapping paper and roll the weaving and paper forward under the take-up beam.

As you're finishing your piece, weave an extra inch of the last color for a hem. Place the heddle in warping position and keep tension tight. Cut four warp threads at the center of the loom, leaving them about 8 inches long. Pass them through the heddle and tie in an overhand knot close to the weaving surface. Do this across the loom, working alternately to left, and right of center. Unroll the weaving, remove the rags you wove in at the beginning, and repeat tying the threads.

Clip the ends to 1 or 2 inches, fold them and the extra inch of weaving under, and hem. Slip a dowel through the pocket at the top. Your tapestry is ready to hang. ★★★

BOOKS

The Shuttle-craft Book of American Hand-weaving; Atwater, Mary M., New York, N.Y., Macmillan 1956.

New Key to Weaving; Black, Mary E., Milwaukee, Wis., Bruce Publishing Co., 1957.

Hand-Loom Weaving; Christopher, F.J., Hackensack, N.J., Wehman Bros., 1961.

Contemporary Handweaving; Overman, Ruth, and Lula Smith, Ames, Iowa, Iowa State College Press, 1958.

Handweaving; Plath, Iona, New York, N.Y. Scribner, 1964.

The Joy of Handweaving; Tod, Osma G., 2nd ed., Princeton, N.J., Van Nostrand, 1964.

Step-by-Step Weaving; Znamierowski, Nell, Racine, Wis., Western Publishing Company, Inc., 1967.

PERIODICALS

Craft Horizons, 16 East 52nd St., New York, N.Y. 10022.

Handweaver and Craftsman, 220 Fifth Ave., New York, N.Y. 10001.

Handweavers Guild of America, 339 North Steele Rd., West Hartford, Conn. 06117.

The Shuttle Craft Guild, 4499 Delta River Rd., Rt. 1, Lansing, Mich. 48906.

SCHOOL DIRECTORY

The Yarn Depot, Inc., 545 Sutter St., San Francisco, Calif. 94102.

School of the Art Institute of Chicago, Michigan at Adams, Chicago, Ill. 60603.

Fashion Institute of Technology, 227 West 27th St., New York, N.Y. 10001.

Temple University, Tyler School of Art, Beech and Penrose Ave., Philadelphia, Pa. 19126.

WEAVING SUPPLIES AND KITS

Beka Inc., 1648 Grand Ave., St. Paul, Minn. 55105. Loom kits and supplies.

Lily Mills Co., Shelby, N.C. 28150. Loom kits and supplies.

Midway Ornamental Mfg. Co., 1708 State, Rt. 558, Salem, Ohio 44460. Spinning wheel kits.

School Products Co., Inc., 1201 Broadway, New York, N.Y. 10001. General supplies.

Structo Div., King-Seeley Thermos Co., Freeport, Ill. 61032. Looms and equipment.

The Silver Shuttle, 1301 35th St., N.W., Washington, D.C. 20007. Looms, equipment and supplies.

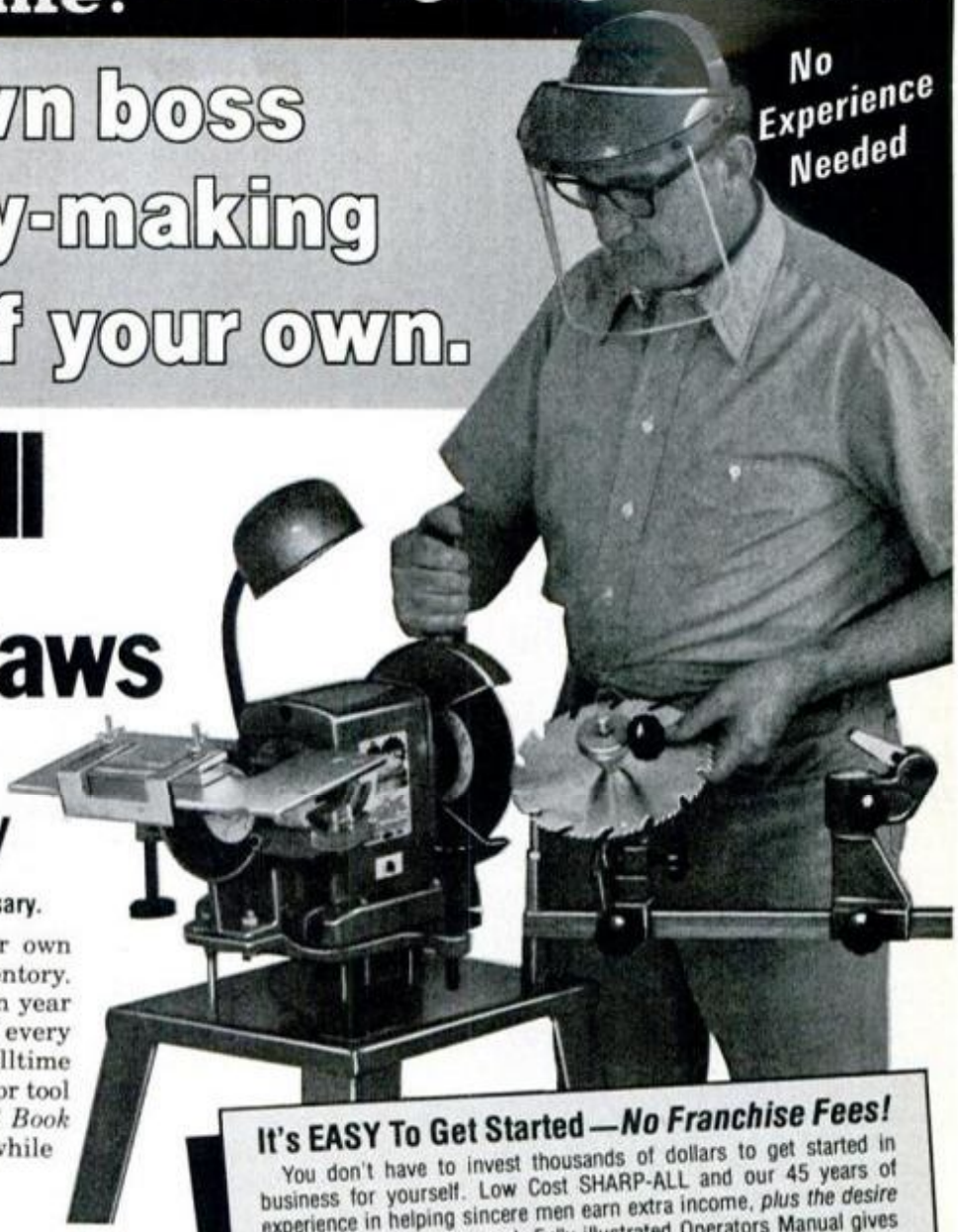
Threadbare Unlimited, 289 Bleecker St., New York, N.Y. 10014. Looms, equipment and supplies.

Материал, защищенный авторским правом

Turn Extra Time Into Extra Income! Earn $5 TO $8 an Hour

Be your own boss in a money-making business of your own.

No Experience Needed



Sharp-All lets you Sharpen Saws

garden and shop tools for home and industry

Start Earning FAST—No Experience Necessary.

With SHARP-ALL it's easy to start your own business. No selling is involved, no inventory. People bring in their work . . . you take in year round CASH Profits and keep 90¢ out of every dollar you earn. Work sparetime or fulltime right at home in your garage, basement or tool shed. Work the hours you want—*FREE Book* tells how to start your own business even while working at your regular job.

Big PROFITS In Sharpening.

Every home and business has saws and tools that need periodic sharpening. There's plenty of business waiting for the man who can sharpen saws, planer knives, jointer blades, wood chisels, scissors, pinking shears, snips, lawnmowers, axes and other garden, shop and home tools. SHARP-ALL does *ALL* these jobs and more . . . quickly, and at a big profit. You will be sharpening headquarters for carpenters, builders, lumberyards, factories, home workshops and hobbyists . . . hundreds of jobs right in your own neighborhood.

It's EASY To Get Started—*No Franchise Fees!*

You don't have to invest thousands of dollars to get started in business for yourself. Low Cost SHARP-ALL and our 45 years of experience in helping sincere men earn extra income, *plus the desire to get ahead* is all you need. Fully illustrated Operators Manual gives clear, step-by-step instructions, shows exactly how to sharpen each tool, where to get business, what to charge, how to get free advertising . . . all the "tricks of the trade". And, SHARP-ALL does the kind of precision job that brings customers back time after time.

Send for FREE Book "Lifetime Security." *Do It Today!*

There is NO OBLIGATION and NO SALESMAN Will Call!

ACT NOW! Coupon Brings Full Details!

SEND FOR FREE FACTS TODAY!

You risk nothing by accepting this offer to see how easily you can turn your spare time into Big CASH Profits with your own Complete Sharpening Shop. Send coupon or mail postcard for full details on our exclusive

30-Day FREE Trial Offer!

FREE Booklet gives full details—

Our Free Book tells how to start a profitable, lifetime home sharpening business, how we help you grow, how we'll finance you.

Send for your copy today. No obligation.

No Obligation . . . No Salesman

FREE BOOK

RUSH COUPON TODAY!

BELSAW

BELSAW SHARP-ALL CO.
717F Field Bldg.
Kansas City, MO 64111

Please send my FREE copy of your book "Lifetime Security" and full details on your 30-Day Free Trial Offer!

Name _____

Address _____

City _____ State _____ Zip _____

BELSAW SHARP-ALL Co., 717F Field Bldg., K.C., MO 64111

SPLIT-IMAGE TRANSIT
The Most Revolutionary LEVEL & INCLINE MEASURE Ever Made!
IDEAL FOR:
Contour plowing
Carpentry
Brick laying
Cement Work
Surveying,
Etc. $16.95
plus $1.50 Postage & handling
leatherette case $3.95
This simple yet amazingly accurate instrument indicates level and measures incline down to a fraction of an inch. Makes bubble type or string levels obsolete. It not only indicates level, but shows exactly how much correction is needed. Just one person, using the split-image transit and target supplied with it, can perform any levelling, incline-measuring job quickly, easily, accurately—measures inclines down to the thinness of a dime at 25 feet.
Send check or M.O. 10 day money back guarantee.
J.W. HOLST, Inc. Dept. PM-27, 1864 E. US-23
(Mi. Res. add 4% Sales Tax) East Tawas, Mich. 48130

Fast, clean accurate boring in 17 sizes ¼" to 1½"
Irwin Speedbor® "88" bits are Hollow Ground to bore cleaner, faster at any angle
Now step-up the boring range of your small electric drill or drill press to 1½" with Irwin Speedbor® "88" wood bits. ¼" shank chucks perfectly. No wobble. No run-out. Sharp cutting edges on exclusive hollow ground point start holes faster, let spade type cutters bore faster. You get clean, accurate holes in any wood at any cutting angle.
Each Irwin Speedbor "88" is forged from single bar of finest tool steel. Each is machine-sharpened and heat-tempered full length for long life. 17 sizes, ¼" to 1½". Buy singly, or in sets, at your Irwin hardware or building supply dealer.
Speedbor "88" sets.
6 and 13-bit sets in metal storage rack.
4, 6 and 13-bit sets in red plastic roll.
Irwin Screw Starter.
Marks hole, starts hole, threads hole for screw to easily enter wood and non-metal materials. Handiest tool in years for home and job. Get one soon.
IRWIN® every bit as good as the name
at Wilmington, Ohio 45177, since 1885

WILDLIFE PHOTOGRAPHY

(Continued from page 76)

pected skillet-size hooves to redesign my body. But the moose had stopped at the forest's fringe and now stared at me, apparently entranced (or maybe even amused) by my performance. This time, though, I got the shots.

A long lens is best

The importance of at least 400 mm worth of telephoto lens for wildlife photography cannot be overemphasized. If a 400-mm forces you to back away to get the whole scene in your finder, remember you're less likely to spook wildlife by backing away from it than approaching it, as you might have to with a shorter focal length. A 400-mm telephoto magnifies eight times. This figure is arrived at by dividing the focal length of your normal 50-mm lens into the longer lens's focal length. The value of this as a *minimum* focal length has proved itself to me time and time again.

A good example took place in Rainy Mountain Provincial Park in Manitoba, Canada. Chance had put me at the head of a caravan of competitive outdoor writer-photographers. My wife spotted a black bear tearing chunks from the rotting carcass of a whitetail deer.

A feeding bear can make an interesting shot. But bears are almost as touchy about defending their dinners as they are about their young, so I cautiously broke out my 400-mm lens to shoot with.

The others laughed at my timidity —but they stood just as far back from the bear as I did. And since they all were using 200-mm or shorter lenses, I alone was able to fill my frame with the bear from our common shooting spot. The 200-mm users had to settle for half-filled frames, and the rest for even less. I sold several of my shots to major magazines—one for enough to buy me my new 400-mm with follow-focus—so I guess the last laugh was mine.

Read before shooting

Once you decide to get into wildlife photography, start building up a library of books and articles. And read them—don't just store them on your shelf. A few minutes before retiring each night will soon give you an insight into wildlife behavior, where animals range, the best time of year to photograph them.

One of the important things you'll learn is that often you need go no farther than your back yard to photograph wildlife. And you can devise simple tricks to bring *them* to *you*. Once I thought it would be nice to have a picture of a bird standing on my follow-focus lens. I put it on a camera and a tripod in my back yard and taped a tiny box of bird seed to the far side of the lens barrel. In minutes some pinyon jays were using the lens for a runway and pecking at the seeds. I shot pictures of them with a second camera and telephoto lens through a partially opened window of my house. A tape recorder playing the calls of the animals you're trying to shoot or their prey will help, too. But be sure your bait equipment doesn't show in the photo.

Easy blinds

Houses and cars make excellent blinds; I've shot hundreds of wildlife pictures from them. Expose as little of yourself as possible, and the odds go up for your getting good shots.

When I can't use a house or car, I resort to my light, super-portable mini-blind: a 9-foot square of camouflage netting—the one that fooled the coyote—and a small, folding camp stool. Drape the netting over you, and its loose weave allows fairly good vision out. Just remember to secure the netting to the lens's sunshade with a rubber band, so it doesn't fall in front of the lens.

The blind can be set up in seconds, and really works. Driving the highway toward Grand Canyon one summer day, I saw several hummingbirds sipping nectar from roadside flowers. The birds flew away when I approached, of course, but returned after I had rigged the blind and crawled inside. Some of them flew within inches of the netting. I use the blind too, in conjunction with some of the wildlife calls available today.

If you want a 100-percent guarantee, try your nearest zoo. Even the pros occasionally depend on zoos for shots of certain animals (they'll kill me for telling). Recently a wildlife publication sent me on assignment to the Phoenix zoo to photograph a mustached tamarin, a member of the New World monkey family. It was a lot cheaper than sending me to South America to photograph them in the wild.

Although shooting through bars, screens and fences would seem to be a problem at a zoo, you can often photographically eliminate them. Put a long-focal-length telephoto on your camera—the 400-mm is often ideal—and change distances a few times, refocusing on your subject

(Please turn to page 140)

Материал, защищенный авторским правом

the *Hydrocat* power/sailer catamaran system.

With a component system you can pick the kind of boat you need for the fun you want.

Build the system: One set of unsinkable hulls, one sail deck and one power deck, and you're ready for the kind of action you're looking for. Take the family for a sail — or bolt on the power deck for waterskiing, fishing, diving — even power-surfing to beaches other boats can't get to. (Changing decks takes only a few minutes.) We built the two-deck boat system for under $590*, including sail and rig, poured foam, steering, windshield, carpeting and finishing. Hulls with Sail Deck and sailing rig cost under $400 and hulls with Power Deck ran under $450.

Hydrocat hulls like it rough or smooth. With the same sort of planing bottoms found on competition hydros, they'll take en-

gines up to 35 H.P. — long or standard shaft — for extra-smooth cruising at ski speeds (or down to 4 H.P. for a stable, efficient trolling platform). Above the waterline Hydrocat hulls are shaped for rough water and the rugged conditions of power surfing for sure-fire fun in the swells.

The Hydrocat power deck features built-in trim tabs for exact tuning to your power and load needs, with over 10 cubic feet of trunk space behind the two-place cockpit. There's a family-sized payload of 1,000 pounds on the Sailing Cat, with cockpit-controlled, flip-up rudders and a cubby for stowing gear. All components are light enough for two-man handling (no special trailer needed), and parts can be stacked for compact, off-season storage.

Hydrocat construction uses all standard-size lumber stock — no special tools, boating hardware, welding or fibreglassing. Stressed-skin, 14½ foot plywood hulls are foam-filled for worry-free, leakproof performance and simplified framing and sealing.

Our building guides take you through each step of construction with complete, pre-tested plans, illustrated assembly steps, detailed instructions and materials lists — everything you need to know to build the Hydrocat System from scratch.

Time-saving, pre-cut plywood panel kits for Hulls and Decks are also available (you supply straight cut framing and hardware). Detailed kit information and ordering information are included with complete plans package (Plans price refunded with kit order).

*All costs based on West Coast retail prices. Engine, remote hook-up and taxes not included.

STEVENSON PROJECTS, Dept. H-1, P.O. Box 584, Del Mar, California 92014. CHECK PLANS OR KIT DESIRED:

Complete HYDROCAT Building Plans: $7.00 _____

	MARINE GRADE PLYWOOD	DFPA ABX GRADE Plywood (as pictured)
Power:	$305.00 _____	$250.00 _____
Sail:	$295.00 _____	$245.00 _____
SYSTEM	$320.00 _____	$265.00 _____

Charge to your MASTER CHARGE:

□□□□□□□□□□□□□□□□ □□□□
Account Number Interbank Number

Mo._____Yr._____ _____
Expiration Date Signature

MAILING LABEL (PLEASE PRINT)

Name: _____

Address: _____

City: _____

State: _____ Zip: _____

Satisfaction Guaranteed, or your money back.

ALL KIT PRICES ARE F.O.B. DEL MAR, CA 92014 (Make checks payable to STEVENSON PROJECTS. Please allow 3-4 weeks for delivery.) California residents please add 6% sales tax on all orders.

Материал, защищенный авторским правом

EASYDRIVER® - COMES BOXED FOR GIFT GIVING

Twice The Turning Power. Half The Effort.

Now a major break thru in hand tools.

The Easydriver® ratchet tool system. Patented ball shaped head with three enclosed rust and corrosion proof **ratchets** gives you over twice the turning power of conventional screwdrivers or nutdrivers. Just insert shaft in one end to drive—other end to loosen.

Interchangeable shafts, bits and socket adapters give you six tools in one! Lets you handle even the most stubborn screws, nuts and bolts. Faster and easier.

Also solves problems of grip—especially greasy hands—since ball allows straight arm torque. And with the unique ratchets there's no need to release pressure or change hand position.

Easydriver®. Truly a tool accepted by the professional and "homeowner" alike. Over 750,000 in use today!

Complete Kit NOW ONLY $14.95
Postpaid

White Products INC.
Thompsonburg Road, Dept. P-2
Londonderry, Vermont 05148

Full year Warranty on G.E. Lexan® resin ratchet ball.

SIX TOOLS IN ONE!
Includes ratchet ball, stainless steel drive shaft, 3 industrial grade bits (Phillips & slotted), 7" heavy duty screwdriver shaft, 2 socket adapters (1/4" & 3/8"). Also waterproof storage kit. Other accessories available.

30 DAY NO-RISK TRIAL

Try the Easydriver® for 30-days. If not completely satisfied, return kit for a prompt refund.

Please rush me ___Easydriver® Kit(s) at $14.95 each, price includes shipping/handling
☐ Send me FREE brochure.
Send ☐ check or ☐ money order. Sorry, no COD's.
If charged to: ☐ BankAmer. ☐ Master Ch. ☐ Am. Ex. include bank & card nos., exp. date & signature.

Name(Print) _____
Address _____
City _____
State _____ Zip _____

White Products Inc., Dept. P-2, Londonderry, Vermont

WHEN YOU BUILD AN M&S CLOCK...

Quality

Is the DIFFERENCE!

NEW 32-PAGE COLOR CATALOG shows 19 authentic antique replica floor, wall & mantel clocks plus the fine woods & imported movements needed to build them. SEND $1 for catalog & 1 of the following plans to build: Grandfather ☐ Grandmother ☐ School ☐ or Steeple ☐ clock. SEND $3.50 for catalog & all 4 plans.

CATALOG ALONE 50¢

Write today!

MASON & SULLIVAN COMPANY

Dept. PM17
Osterville, Ma. 02655

FOR • KITCHEN • WORKSHOP • BOAT • TRAILER • CAMP • GARAGE

MAGNETIC

Solve your HANG-UPS

Magnabar Mark XII. Lifetime guarantee, convenient, practical, versatile, trouble-free. Fashioned in 12" hardwood, singly boxed. Mounts quickly on any surface. Excellent gift. Model SS-12: **$5.95** p.p. each. Send check or M.O.

Complete Catalog on request.

Magnabar XII

Phelon Magnagrip Company, Inc.
Dept. A118 East Longmeadow, Mass. 01028

GARAGE HEATER KIT

OUT PERFORMS THEM ALL

ONLY $21.95

HIGH QUALITY SPARK PROOF DESIGN

TAKES LOGS ALMOST 3 FEET LONG

THIS HEATER KIT CONVERTS A 55 GALLON DRUM (NOT INCLUDED) INTO A HIGH CAPACITY WOOD BURNING HEATER FOR WORKSHOP, BASEMENT OR CABIN. HELPS INSURE AGAINST ENERGY SHORTAGE OR POWER OUTAGE. WILL BURN OVER 24 HOURS ON LOW DRAFT. HEAVY GAUGE STEEL KIT INCLUDES LEGS, STOVEPIPE FLANGE, DOOR ASSEMBLY WITH DRAFT CONTROL, BOLTS, NUTS AND EASY BOLT TOGETHER INSTRUCTIONS. SHIPPED TO YOU ONLY $21.95 PLUS $2.50 EAST OR $4.00 WEST OF MISSISSIPPI RIVER. OR $5.75 TO ALASKA (OHIO RESIDENTS ADD 4½% SALES TAX). UNCONDITIONALLY GUARANTEED.

SOTZ CORPORATION, 23797 SPRAGUE RD., COLUMBIA STATION, OH. 44028

WILDLIFE PHOTOGRAPHY

(Continued from page 138)

until the barriers blur out of focus enough to disappear.

More equipment tips

As mentioned earlier, insects are a part of the wildlife scene. A picture of a butterfly on a flower can have as much impact as a grizzly-bear portrait. Since many telephoto lenses focus no closer than 25 or 30 feet (some go down to less than 12 feet, but they're usually very expensive), a bellows must be put between the lens and the camera to extend the focusing range. Now you can fill the frame with tiny subjects, yet remain far enough away not to frighten them off.

When you get deeper into wildlife photography, you'll want a second camera body. Nothing can be more frustrating than to work for hours to get into position, then have a camera malfunction, and not have a spare. It also speeds up lens-switching if you keep a different lens on each of your two bodies.

Investigate the big zoom lenses, too. Using a 200-500-mm zoom in southern Montana, I was able first to take pictures of several bighorn sheep together, then zoom in on individual herd members. The lens virtually eliminated the need to move about and perhaps spook the animals into flight.

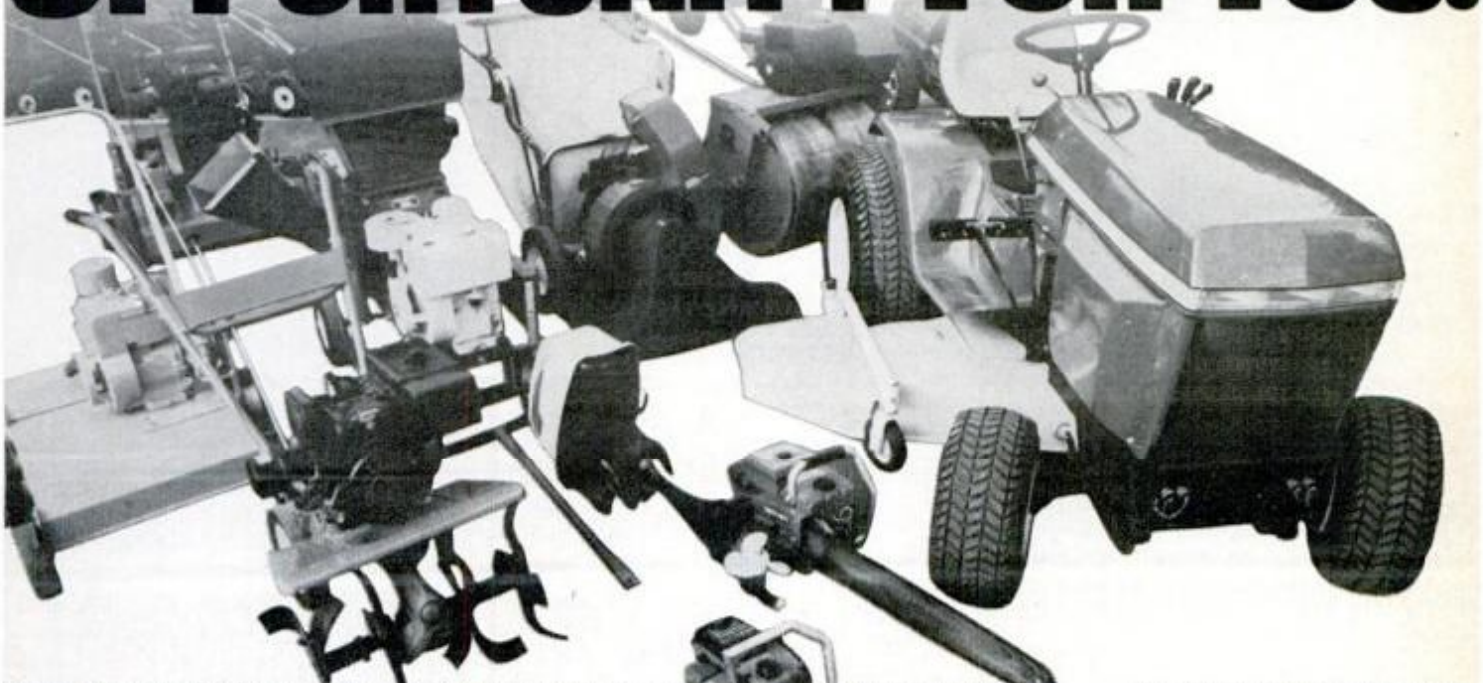
Because telephotos are slower lenses, transmitting less light, many wildlife photographers standardize on high-speed films. Under the best of conditions, these films are not too bad; in poor light, when you really need them, they leave a lot to be desired. My standard is Kodachrome 64 for wildlife photography. On occasions I've had editors choose my work over that of other contributors because of the quality of my film.

If you want to take wildlife pictures to sell, you must be much more demanding than one who shoots for personal enjoyment only. You'll quickly learn that pictures of animals or birds, just standing or sitting are doomed to sit forever in your files. To sell, they must show action or unusually attractive composition.

All my life I have been a hunter. But I find wildlife photography just as exciting and rewarding. The photographer must often approach closer than the hunter to bag his trophy; and he usually has no gun to defend himself. If you become addicted to wildlife photography as I am, maybe someday I'll see you out on a hill. That is, if you're not in your mini-blind. ★★★

Материал, защищенный авторским правом

50 MILLION LITTLE ENGINES ARE A BIG OPPORTUNITY FOR YOU.



Learn to repair them at home with NRI's new small engine repair course.

Every machine powered by a small engine represents a potential need for professional service and maintenance. NRI can give you the training you need to cash in on this opportunity...at home and in your spare time.

Only NRI supplies you with an Engine Component Kit designed for training.
Hands-on experience comes quickly with the NRI Small Engine Repair Course. Along with the bite-size lessons fully illustrated, you receive all the components of a versatile 3½ HP Clinton Engine. Using NRI Power-On training principles, you assemble the complete engine, to use in your workshop or to install at a profit on one of your first jobs.

Where other courses give you inexpensive hand tools, NRI includes with its training an *inductive tachometer, professional volt ohm meter, torque wrench, valve spring compressors, and all the wrenches and specialized tools you need to start your own repair shop.*

Two courses available.
The 30-lesson Basic Repair Course covers the theory and practice of small engine operation and repair including lubrication, ignition, cooling, and starting systems. You specialize in professional lawn mower and other lawn-and-garden equipment repairs. You learn in depth...with up to 10 times as much information provided as in competitive courses.

With NRI's 45-lesson Master Repair Course, you move into more advanced training. Lessons cover chain saws, minibikes, mopeds, outboard engines, snowmobiles, golf carts, all-terrain vehicles, welders, generator sets, and other industrial equipment...plus six lessons on motorcycle repairs.

You learn the specific engine requirements for power take-offs, charging systems, electrical systems, etc. Practical working knowledge of clutches, torque converters, transmissions, and other drive train parts gives you the professional's edge.

You get more training and more equipment for your money with NRI.
NRI is the unquestioned leader in technical home training, with more than a million students in its over six decades of instructional service. The oldest and largest school of its kind in the country, NRI offers you expert help every step of the way. You'll move ahead at your own speed, earning as you learn, with small engine repairs for your family, friends, and neighbors.

Send for the free catalog and discover how big your future can be in small engines. No salesman will call. If the coupon has been removed, write to: NRI Small Engine School, 3939 Wisconsin, Washington, D.C. 20016.

NRI McGraw Hill

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

Please rush me the one free catalog I have checked. I understand there is no obligation. No salesman will call.

- ☐ **SMALL ENGINE SERVICE AND REPAIR COURSE** • Basic and Master Courses
- ☐ AUTOMOTIVE MECHANICS Basic and Master Courses
- ☐ AIR CONDITIONING, REFRIGERATION, & HEATING COURSES
- ☐ ELECTRICAL APPLIANCE SERVICING
- ☐ CB/COMMUNICATIONS COLOR TV/QUADRAPHONIC STEREO

Approved under GI Bill if taken for career purposes. ☐ Check for details.

Name _____ Age _____
(Please Print)

Address _____

City/State/Zip _____

A National Home Study Council Accredited School 1102-027

Материал, защищенный авторским правом

(Continued from page 87)

New front-end sheet metal was part of the restyling for 1977 model year.

braking. The rear tires had a habit of locking up during panic stops.

But with this lightweight, ohc Four, handling becomes much better balanced, more natural, surer and easier. The car now behaves beautifully in all situations. There's still some understeer in high-speed cornering, but not nearly so such as with the Six.

Another surprise came in the area of noise and vibration. There wasn't much of either. The engine and drive train mount in rubber, and there's a tuned weight on the transmission that counters harmonic vibrations. There's relatively little shaking and rumble noticeable in the passenger compartment. And the Chrysler-built automatic transmission shifts in positive steps, but not jerkily as in some small cars.

This four-cylinder engine weighs some 295 pounds—200 pounds less than the 232-inch Six. Thanks to the lighter engine, front suspension and driveline are lighter, too, giving an extra weight saving in the chassis. Curb weight of the four-cylinder Grem with stick comes to 2550 pounds, as compared with 2761 for the six-cylinder version.

The lighter front end allows a quicker manual steering ratio (25:1 vs. 27:1), so this again perks up handling. It's a responsive car now—something it wasn't before.

The new engine, is based on an Audi powerplant that's used in the Porsche 924 and a German light-duty VW truck. However, very few components interchange between the Audi and the AMC versions. AMC designed its own manifolds and mounts a two-stage Holley-Weber carb (almost identical to the one used by Pinto and Vega).

New plant for new engine

American Motors has just finished building a $60-million factory in Richmond, Ind., where the four-cylinder engines will be manufactured under an agreement with the German company. For the moment, AMC Fours are being assembled in Indiana from basic parts shipped in. But very soon this Indiana plant will begin turning out its own components and assemble the engine as a totally American product.

AMC has the potential for building some 275,000 Fours a year, and the agreement with the Germans is to make enough engines to eventually start selling them back to Audi. There's also talk about this engine going into a smaller AMC car in the future.

This appears to be a good engine—astutely engineered and put together for a combination of durability, performance and economy. That plus the Buyer Protection Plan II and a base price below $3000 makes the new Gremlin Four worth a second trial spin. ★★★

YOU CAN DO IT!

Install a Genie yourself and save.

Installation is easy when you follow the step by step instructions provided with every Genie unit. Five common household tools, a step-ladder, and a Saturday afternoon are all you need.

In just a few hours your family can enjoy the comfort and convenience of a Genie Automatic Garage Door Opener System. . .the system most people know and prefer.

Thoroughly tested and UL listed. Solid state radio controls certificated to comply with FCC regulations.

Genie

Featuring SEQUENSOR™ "the computer-controlled brain" (supplied with 404 & 450 only) and CRYPTAR® II Digital Controls, with 3000 codes.

automatic garage door opener system by Alliance.

For a free Genie do-it-yourself brochure, mail this coupon today or visit your nearest Genie dealer. PM-2
The ALLIANCE Manufacturing Co., Inc.
Alliance, Ohio 44601

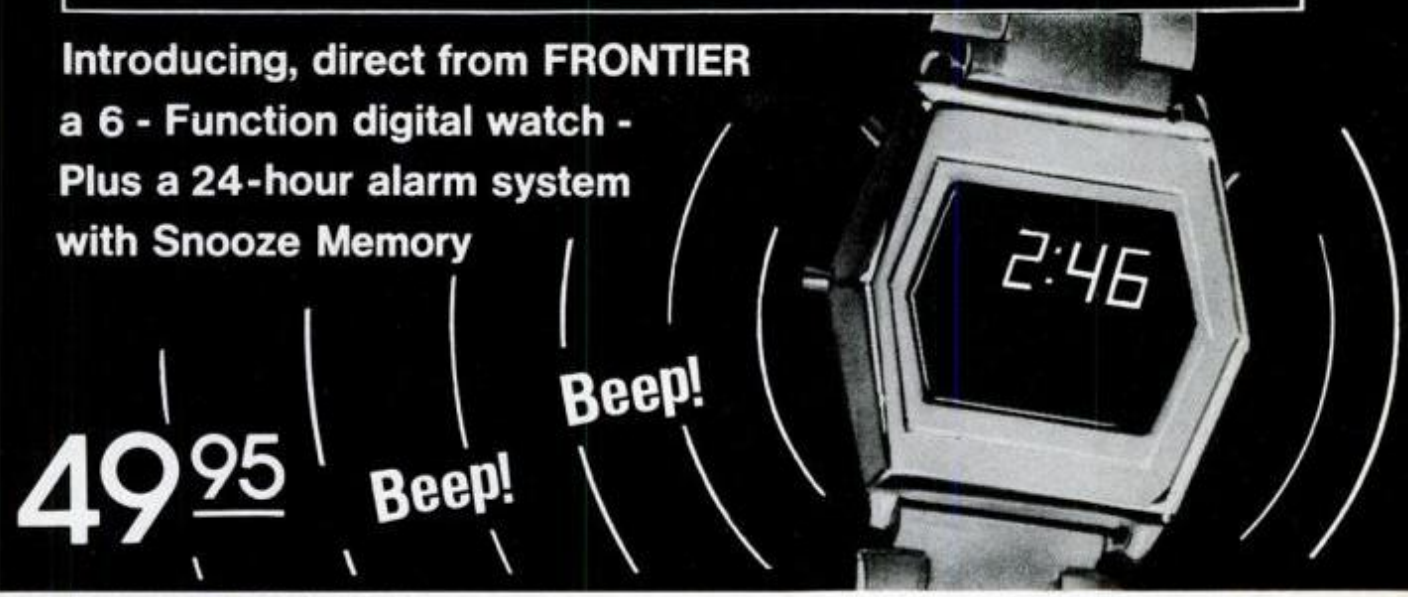
Name _____
Address _____
City _____
State _____ Zip _____

The ALLIANCE
Manufacturing Co., Inc., Alliance, Ohio 44601
A NORTH AMERICAN PHILIPS COMPANY ©1976 The Alliance Mfg. Co., Inc.
® Cryptar ® Genie are registered trademarks of The Alliance Manufacturing Company, Inc.

Материал, защищенный авторским правом

AN ELECTRONIC ALARM WATCH BREAKTHROUGH!!!

Introducing, direct from FRONTIER a 6 - Function digital watch - Plus a 24-hour alarm system with Snooze Memory



49.95

DIRECT FROM THE SOURCE

Frontier Inc., one of the largest manufacturers of IC chips and electronic components, (over 3 million modules in many of the most famous brand name watches and calculators in the world) now offers this remarkable timepiece to you directly through Winston-Rogers Associates Ltd. — at a more than remarkable price!

THINK ABOUT IT!

How reassuring to invest in a superb timepiece that is made by a company whose reputation has been built on electronic expertise! And at the same time — because there is no distributor, repackager or middleman — to buy it at a price that is $50 - $100 less than comparable watches available elsewhere!

6 - FUNCTION PRECISION TIMEPIECE

One button controls the 6-function **Quartz** timekeeping system — with accuracy to 15 seconds per month.

- One push gives an instantaneous readout of the exact hour and minute.
- Hold the button and you will have a readout of continuing seconds.
- Push the button twice and your watch will readout the month and date of the month.
- Hold the button and the exact day of the week will appear.

This unique module contains a 4-year perpetual calendar. Adjustment is needed only once every 4 years — at leap year day.

Set this incredible watch to beep at any time of the day or night and the 24-hour alarm memory will beep at that exact minute. Push the recall button at any time to double check the time at which the alarm is set.

SNOOZE CONTROL MEMORY

For your convenience the Alarm Watch will give one short beep prior to its full alarm cycle, allowing you to turn it off without disturbing others. If not deactivated after the first short beep, the alarm will then beep for 15 continuous seconds. Push the deactivate button twice and the alarm is off. However, should you want a further reminder, then push the deactivate button only once and the alarm will go through its cycle again in exactly 5 minutes, allowing you to continue your current activity whether it be a snooze or a phone call without fear of forgetting your next commitment.

Here is a watch that you cannot afford to be without and Winston-Rogers is making them available as quickly as Frontier produces them.

A FULL YEAR WARRANTY IS INCLUDED.

AND NOW CONSIDER THE INCREDIBLE CONVENIENCE OF A PORTABLE ALARM CLOCK HANDSOMELY ADORNING YOUR WRIST AT ALL TIMES!!!

THE ALARM SYSTEM — Imagine:

- Never again missing an appointment because you lost track of the time.
- Never again missing a plane or a train because you didn't realize how late it had become.
- Never again forgetting to make that all-important phone call.
- Never having to worry about forgetting to take important medication on time.
- Always being aware of when you should be coming or going or doing all that your hectic schedule demands — without devoting your valuable time to trying to remember it all.

ALLOW 3 TO 4 WEEKS FOR DELIVERY

15 DAY MONEY BACK GUARANTEE
Winston-Rogers offers products that perform!
Try the alarm watch for 2 weeks.
If not completely satisfied, return watch for a full refund; no questions asked.

TO ORDER BY PHONE: 800 - 325-6400, Oper.5

Missouri res. call 800 - 342-6600, Oper.5

Winston-Rogers Associates Ltd. F3902

Box A69, 1135 Greenridge Rd., Buffalo Grove, IL 60090

Please send _____ Digital Alarm Watches with:

A _____ Silver-tone finish $49.95 plus $1.99 shipping and handling.

B _____ Gold-tone finish $49.95 plus $1.99 shipping and handling.

If I am not satisfied I may return it for a complete refund.

Try the Alarm Watch for 14 days. If not completely satisfied, return the watch for a full refund, no questions asked.

Check or money order. No C.O.D.'s please.

Charge: ☐ American Express ☐ Bank Americard ☐ Master Charge

Card # _____ Exp.Date _____

Signature _____

Name _____

Address _____ Apt. # _____

City _____ State _____ Zip _____

LEARN UPHOLSTERY AT HOME... restore old chairs, sofas to like-new condition! A clean, enjoyable way to put spare hours to profitable use. Old cast-offs picked up for dollars, worth hundreds when reupholstered. Fascinating home study course includes tools, kits, supplies. Earn as you learn — start your own business!

APPROVED FOR VETERANS & NON VETS.

SEND FOR OUR FREE BOOK TODAY! YOU'LL GET A BIG ILLUSTRATED 32 PAGE BOOK ON UPHOLSTERY and the upholstery business and a sample lesson showing how the fabulously successful MUI system is taught. It costs you nothing to get the information and there's no obligation. No salesman will call.

Modern Upholstery Institute, Dept. DNG, Box 16, 1205 W. Barkley Ave., Orange, Calif. 92668

GET STARTED NOW • MAIL THIS COUPON TODAY

Modern Upholstery Institute, Dept. DNG
Box 16, 1205 W. Barkley, Orange, CA 92668

Please mail me a copy of your book, "*PROFESSIONAL UPHOLSTERY for Fun and Profit.*" I understand no one will call and there is no obligation.

Name_____ Age____

Address_____

City_____ State_____ Zip_____

OPPORTUNITY... open NOW for a creative FRAMECRAFTERS studio in your area!

SEND FOR DETAILS!

If you enjoy working creatively with your hands, here's a chance to operate a NATIONALLY ADVERTISED custom picture and portrait framing studio WITHOUT payment of franchise fees! We help you learn all needed craft and business techniques, offer immediate wholesale sources if you qualify. Write:
CREATIVE FRAMECRAFTERS, DEPT. DNG
1205 W. Barkley, Orange, Ca. 92666

LEARN CONCEPTS OF BUILDING!!

These ¾" Scale Kits teach: Building Codes, Framing, to Read Floor Plans, How to Cut Lumber to Length, and much more! Have the fun and get the experience of building an A-Frame cabin, room addition, or 2 bedroom home. All materials, tools, plans and easy to read instructions are included in each kit.

For a free brochure and bonus savings, mail this ad to:

IDENTICAL CONSTRUCTION COMPANY
9002 Rosanna Ave. • Garden Grove, Ca. 92641

DURO

Send for FREE catalogue of the complete do-it-yourself fix-it line from DURO. America's best.

WOODHILL CHEMICAL
18731 Cranwood Parkway, Dept. PM, Cleve., Ohio 44128

If You Like to Ride a Bike for Fun ... Learn to Fix it for Profit!

Be a MOTORCYCLE MECHANIC...

Make good money whether you work for someone else or have your own shop. **Learn at home how to fix any part of any bike!** Send name, address, age for FREE "Career Kit"

NORTH AMERICAN SCHOOL OF MOTORCYCLE REPAIR
Dept. PB017, 4500 Campus Dr., Newport Beach, CA 92663

FURNACE FIX-UPS

(Continued from page 106)

relay that shuts off the oil pump motor if the oil spray doesn't ignite. Without a stack-control relay, oil would continue to be pumped into the combustion chamber, causing a dangerous overflow.

The safety switches can kick the furnace off for other reasons, too. For example, even a momentary drop and surge in electric current would do it. Momentary deviations in current are not uncommon. The power company will tell you that.

In resetting safety switches, the key word is "once." If the furnace fails to reignite after you reset each switch *once*, or if the furnace starts and stops again, *don't* keep fooling with it.

There is only one correct procedure to use when you have to manipulate safety switches: Press the motor overload switch first. If the motor does not start, activate the stack-control relay once. The motor overload switch is usually on the motor housing. The stack-control relay is usually to be found either on the smoke pipe or the burner housing.

■ **Photoelectric cell service.** Your oil burner may have a photoelectric cell that controls furnace functioning. If so, the cell "eye" may have become covered with dirt. Your furnace might start after you activate the stack-control relay, but would shut down after running less than a minute. If you know your furnace has a photocell, clean it first before resetting the safety switches (remember, they should be activated only *once*.)

Unscrew the cover of the photoelectric cell housing and carefully wipe off the cell. Now activate both safety switches. *Caution:* When doing any work inside an oil burner, first turn off all emergency switches or cut off current to the furnace by tripping the circuit breaker or removing the fuse.

■ **Oil valve bypass.** Some oil burners have oil valves that control the flow of oil to the burner according to "need." Furnaces with photoelectric cells, for example, have such valves, which are frequently referred to as delayed oil valves. Check the manufacturer's literature or your oil company to determine if there are any exotic devices on your oil burner.

If a delayed oil valve gets clogged with dirt or malfunctions for some reason, oil won't get to the firebox. No fire, no heat. You can bypass this valve temporarily by disconnecting the input and output oil lines at the

MIND, ORDER, ENERGY.

Which Governs the Universe and You?

What lies behind all existence? Is everything a product of supernatural design? Are humans shifted about by an arbitrary will like pieces on a chessboard? Or does a stupendous energy, without reference to purpose, bring about a ceaseless transformation from atoms to stars and to life itself?

Mind — Order — Energy — may these not be summed up in one word: Consciousness? Behind all a Universal Consciousness, impersonal, eternal. It composes the order of matter, the sensitivity of life, and that personal awareness that is Self.

This is a new age! It is time to reconcile science, philosophy, and mysticism. Truth is found in unifying all experience and knowledge that man has acquired— no longer must man be dealt with separately with prejudice or preference.

ACCEPT THIS FREE BOOK

For a frank, fascinating presentation of a rational personal philosophy of life that dispels superstition and obsolete traditions, write for the free book The Mastery of Life. It is presented by the Rosicrucians (not a religion), a worldwide cultural society. Through this book thousands have learned how they may acquire a fuller life.

Please use this coupon or write to:

SCRIBE: L.G.K.

***The* ROSICRUCIANS**
(AMORC)
San Jose, California 95191 U.S.A.
(Not a religious organization)

Scribe L.G.K.
The ROSICRUCIAN ORDER (AMORC)
San Jose, California 95191 U.S.A.

Gentlemen:
Please send me the free book *The Mastery of Life*. I wish to learn more about *Self* and its cosmic relationship and how I may benefit therefrom.

Name_____

Address_____

City_____ State_____ Zip_____
(Please print name and address)

Материал, защищенный авторским правом

valve, removing the valve and joining the input and output lines. Do this, however, *only* if you have the proper pipe fittings that will assure a leakproof and airtight connection.

■ **Nozzle-electrode assembly inspection.** Turn off all emergency switches, loosen the oil line connection, and disconnect the transformer and electrode wires. Remove the nozzle-and-electrode assembly and lay it on a clean surface.

Detach the nozzle. Inside may be a small filter. Wash it in warm water. If you find a small setscrew inside the nozzle, remove and wash it, too. Blow through the nozzle. If the passage is clear, air will pass freely. If the passage is blocked, replace the nozzle with a spare you foresightedly put in reserve.

If there is no spare, you could try to clear the blockage with a strand of wire that is thinner than the nozzle opening. *However*, if the nozzle is widened at all, "puff" will occur when the furnace is turned on. Furnace puff makes a lot of noise but causes no damage.

Clean off the electrode tips with a piece of fine steel wool, but be careful not to upset the electrode gap. If it is disturbed, reset it according to the drawings on page 105.

After everything is buttoned up again, turn on emergency switches and activate the stack-control relay.

Tip: If you want to avoid the emergency deep freeze, have your oil burner cleaned and serviced by a professional *before* the blizzard.

Gas burner checklist

■ **Thermostat inspection, fuse or circuit breaker examination and on-off switch check.** All this is done in the same way as discussed before. However, there is usually only one on-off switch, which is mounted on or right near the furnace.

■ **Pilot light check.** The pilot light may be out, so attempt to relight it as outlined on the furnace instruction plate. Here's a typical procedure: 1. Turn down the thermostat and turn off the furnace on-off switch. 2. Shut off the main gas valve, then relight the pilot.

If the pilot does not light, a piece of dirt or carbon may be clogging the orifice. Tap the burner lightly with the handle of a screwdriver to try to dislodge the blockage.

Caution: Do not open the main gas valve on the furnace until the pilot is lit and never try to light the main burner manually.

Remember the surest way to prevent a mid-winter furnace failure is to call the serviceman before the heating season. ★★★

Cobra 1977. For the Time of Your Life.

It isn't often you find a recreational vehicle as unique or as special as a Cobra. Cobra combines solid construction, sporty luxury, and extra livability in a way like no other.

For 1977 Cobra gives you three great ways to go:

Century: The Traditionally Luxurious Cobra.

Trak V: The Practical, Mid-Priced Cobra.

Fiesta: The Thrifty, Family-Priced Cobra.

Choose from motor homes, mini homes, van conversions, fifth wheels and travel trailers. The entire Cobra line is highlighted by significant improvements including tough laminated construction on all models — right down to the lowest priced Fiesta. And each is backed by the proven Owner Satisfaction Plan℠ warranty

Life's good times are precious, and you can enjoy them all in a 1977 Cobra. The Good Life is as close as your nearest Cobra dealer See him today or write for his name and information on the entire Cobra line.

Cobra '77. *Welcome to the Good Life!*

PLEASE SEND DEALER NAME AND FREE INFORMATION ON COBRA:

☐ Motor Homes ☐ Travel Trailers ☐ Mini Homes
☐ Fifth Wheel ☐ Van Conversions

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Mail to: Cobra Industries, Dept. J-3
P.O Box 1251 Elkhart, Indiana 46514

PARKS 12" PLANER and JOINTER COMBINATION

A full 12" thickness planer and 12" jointer. Sturdy, compact, space saving, precision built for accuracy. Famous Parks quality.

Write for literature on Planers, 18" Band Saws and Panel Saws.

The Parks Woodworking Mach. Co., Dept. PM 1501 Knowlton Street, Cincinnati, Ohio 45223

"Mfrs. of Quality Woodworking Machines Since 1887"

SAVE BIG!

Big Job Tractor Kit

Great traction, power. Build your own 16 hp. tractor. Factory direct savings. Field proven. 30 attachments — mower, snowblower, garden tools. 12-pg. Catalog — 50¢; build-it-yourself Plans — $6.00 (refunded on any purchase). **Struck Corp., Dept. PM27T, Cedarburg, Wis. 53012**

WOOD WORLD CLOCK CO.

Build this authentic Reproduction

- Do-it-yourself pre-cut kit
- Solid black walnut
- West German Movement

Write for FREE Brochure

WOOD WORLD
P. O. Box 32, Dept. 25
Theodore, AL. 36582

ARCO "TOOLS-OF-THE-MONTH"

BEST VALUES! LATEST FEATURES! TOP QUALITY!

CARRY ONLY 3 DRILLS

The deeper you drill, the larger the hole. Cutting point starts own hole—no center punching. Single flute cuts faster, eliminates chatter assures clean, round holes. Use with any elect. drill to enlarge holes, ream, deburr pipe. Cuts steel, wood, plastics.

No. 1580M Multi-Drills, 3 Sizes. Only $6.50

No. 1584 Multi-Drill — cuts any size hole from 11/16" to 1" $4.95

- SANDS
- PLANES
- REMOVES PAINT

Most efficient Rasp ever made! Fits any elect. drill. 5" diam. bottom surface has 400 sharp teeth for smooth finishes. Cuts wood, plastic, wallboard. Hardened tool steel. ¼" shank.

No. 1255M Disc-Rasp. $1.98

Save! Get above Disc-Rasp PLUS 2 EXTRA DISCS. No. 1256M . . . . . Only $3.98

These and over 400 other ARCO Tools available at Hardware Depts, everywhere, or order direct on 30-day Money Back Guarantee.

WHIZZ-DISC

Silicon Carbide Cutting Wheel and Sanding Disc

WHIZZ-DISC is 2 tools in 1. Used edgewise, it cuts the toughest materials—even concrete & brick! Used sideways, it is a Sanding Disc for removing rust & paint, as well as smoothing, shaping & sharpening all metals, stone, wood. No sharp teeth grab the workpiece. Includes 7" Disc, backing pad, arbor and washers.

No. 1400M Whizz-Disc . . . . . Only $3.59

Save! Get above Whizz-Disc + 2 Extra Discs. No. 1403M. . . . . Only $6.59

MAIL THIS COUPON TODAY!

ARCO PRODUCTS CORP., Dept. PM-2,
110 W. Sheffield Ave., Englewood, N.J. 07631

Ship at once on your 30-day Money Back Guarantee:

- ☐ No. 1580M Multi-Drills, 3 Sizes . . $6.50
- ☐ No. 1584 Multi-Drill 4.95
- ☐ No. 1255M Disc-Rasp 1.98
- ☐ No. 1256M Disc-Rasp with 3 Discs. 3.98
- ☐ No. 1400M Whizz-Disc. 3.59
- ☐ No. 1403M Whizz-Disc, 3 Discs . . 6.59
- ☐ I enclose Check, M.O. — Ship Postpaid. Orders under $5.00—Add 50¢. No COD's

Name.....

Address.....

City.....State.....Zip.....

Beautiful Dreamer...

Sleep On An INFLATE-A-BED

From $49.95

The World's Most Comfortable Bed—You "Adjust" it to Your Own Personal "Firmness Level"—End backaches forever!

Also . . . The Only Guest Bedroom You Can Store On A Shelf!

Inflate-A-Bed. The most natural way to sleep or relax. Instead of your body fighting with steel coils, wooden frames, stuffing and cloth, you can sleep in suspended luxury—on a cushion of air, just like a cloud on a summer afternoon. We **guarantee** your sleeping comfort will be markedly improved, that you'll sleep deeper, more restfully and with less morning aches than you ever thought possible. Tens of thousands of people are sleeping on one nightly, and chiropractors all over the nation are recommending them to many of their patients.

Inflate-A-Bed is the most exciting bedding product ever developed since early man discovered straw. It is a specially patented "air coil" bed you inflate in minutes with a vacuum cleaner or any air pump. The innovative air coil system works to support your body evenly. You don't sink in the middle and the sides don't fly up. Two people can sleep on a full, queen, or king bed virtually undisturbed by each other's movements. The bed shapes itself to your body almost like cradle-ing it—with unheard of flexibility in a mattress. You inflate it to suit your taste. No frame or innerspring is needed, although it will fit into any standard bed frame.

Inflate-A-Bed is incredibly light and incredibly tough (20 mil Poly Vinyl Chloride). It cleans easily with soap and water. It deflates in minutes for you to fold up and take with you—visiting, camping, beach (a dynamite water raft) or moving to a new home. Store it easily on a closet shelf when not in use. It is everything a bed should be—delightfully sensual, highly therapeutic, and conveniently mobile. Sleep on it for a 7 night trial. If you're not pleased, return it for an immediate refund.

Please send the following Air Bed(s). If not fully satisfied I can return within 2 weeks for an immediate refund.

☐ Twin Size @ $49.95 ☐ Full Size @ $69.95
☐ Queen Size @ $79.95 ☐ King Size @ $89.95
(Add $4.95 for shipping and insurance)

☐ Instead I prefer the Original Inflate-A-Bed (same as above plus a flocked velveteen finish)
☐ Twin @ $59.95 ☐ Full @ $79.95
☐ Queen @ $89.95 ☐ King @ $119.95
(Add $4.95 shipping per bed)

☐ Also send high-powered AC air pump @ $29.95 ea.
☐ Also send high-powered DC air pump @ $29.95 ea.
☐ Check or M.O. Enclosed (Ill. residents add 5% sales tax)
☐ Charge My Credit Card Checked Below
☐ American Express ☐ BankAmericard ☐ Carte Blanche
☐ Diners Club ☐ Master Charge

Credit Card #_____

Master Charge Bank # _ _ _ _ Exp. Date_____

Name_____

Address_____

City_____ State_____ Zip_____

Signature_____ PM-2/77

Send Coupon To:
Contemporary Marketing, Inc.
790 Maple Lane, Bensenville, Ill. 60106
Call Toll Free: 800-621-8318 Ill. call: 312-595-0461

HOW TO STOP HESITATION

(Continued from page 103)

the terminal. Hold the screwdriver by the handle, so you don't get shocked, and place the shank ¼ to ½ inch from a ground.

Have someone start the engine. If a blue spark jumps the gap, reconnect the cable and let the engine idle until its gets hot. Then retest.

If other than a blue spark appears when the engine is cold, the coil, condenser, breaker points or a primary ignition wire is faulty. Check points; if badly pitted, replace them and the condenser. Be sure a primary wire isn't loose or grounding.

Another way to test ignition is to pull any sparkplug cable from the distributor cap. Hold the cable with insulated pliers so the cable terminal is about ¼ inch from the terminal in the cap. Crank the engine and check for a strong, blue arcing spark.

If other than a blue spark appears when you test the ignition system with the engine hot, the coil is probably breaking down and should be replaced.

Caution: Do not do this test if your car has electronic ignition.

On a hunch that maybe it's the reason, see that the timing of the ignition system is set to specification and that the vacuum advance isn't failing on acceleration. The vacuum advance can be tested with your timing light by determining that timing advances about 3° when the engine is accelerated with the vacuum advance unit reconnected.

Fuel supply

Most hesitation problems have a fuel-system-related condition as their cause. The trouble may be between fuel tank and carburetor, or it may be in the carburetor itself. Make easy tests first.

Replace the fuel filter if a new one hasn't been installed in a while. Test drive the car and see if you still get hesitation.

If the automatic choke can be adjusted (electronic-assist chokes in late models should not be adjusted), set the index one extra notch to the rich side of that specified as normal by the manufacturer. Test drive. Hesitation still? Reset the choke to specification and proceed.

Spread a mixture of motor oil and kerosene around the carburetor-manifold joint and float-bowl main body of the carburetor joint as an assistant accelerates the engine. If the mixture is sucked into the joint, you've found the cause of hesitation —loose bolts or a leaking gasket.

(Please turn to page 150)

Материал, защищенный авторским правом

Cash in on these days of fear...

BE A LOCKSMITH!

The demand for skilled locksmiths has never been higher...the pay has never been better and the way to learn has never been easier.

WITH OUR TRAINING YOU CAN SUCCEED . . . HERE'S PROOF:

E. Simmons-El, Bronx, N.Y.
"The Locksmithing Institute is the greatest! My instructors were superb! While training I earned $400 and now make between $25 and $30 more a week part-time!"

George R. Leaich, Sr., Belvidere, Ill.
"I enrolled in the Locksmithing Institute . . . to provide extra income when I retire. Course covers all important phases of locksmithing . . . and it gave me all I expected."

James C. Wisdom, Denver, Col.
"Institute is to be highly commended. Made $2500 while training. Have a well-equipped shop, money in the bank; income has doubled. Who could ask for anything more?"

Harry Provart, Jr., Duquoin, Ill.
"Demand for this work is growing every year as crime gets worse. Earned $200 while training; since then $350 spare time. Your course is the best money can buy."

James R. Steel, Copperas Cove, Tex.
"I started making money spare time almost from the time I started training. Now earning about $275 a month and re-investing it in my mobile shop . . ."

Joseph Wilson, Garden Grove, Cal.
"Your course was a good investment. Earned $2000 before finishing course and now, even though I don't advertise, am making an extra $75-$100 a week in my spare time."

★ Newspaper headlines tell the story.

Pick up a paper any day. Burglary, housebreaking, vandalized homes—no wonder America is locked up tighter than ever before. And there are more homes, more stores and factories, more hotels, more cars, and more people. And that means more keys and locks.

★ Earn as much as $10 an hour—or more.

Today a trained locksmith can just about write his own ticket. Earn as much as he wants to work. Earn in his spare time, in a business of his own, or in a highly-paid position with someone else. Earn in almost any part of the country he wishes to live.

★ Learn at home—earn as you learn.

Let Locksmithing Institute show you absolutely free how you can qualify for this exciting, action field. Mail the coupon below. It will bring you full details about the fast, easy course that trains you by "doing" for this highly-paid profession. See how you can learn at home, in your spare time, even while you hold down your present job. See how the key-making machine and complete set of tools included with the course can put you in business earning money right while you are learning.

★ The fast way to success . . . independence.

From the start you get practical experience doing real jobs on car locks, home locks, padlocks, and safes. Within six months you can be on the road to complete independence—no more low wages, layoffs.
Don't you owe it to yourself to get the facts today? Use coupon below for free information. No salesman will call. You and you alone can make your decision based on the straight-forward facts you will receive.

LOCKSMITHING INSTITUTE

Dept. 1110-027
Division of Technical Home Study Schools
Little Falls, New Jersey 07424

LICENSED BY STATE OF NEW JERSEY. ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL. STATE APPROVED DIPLOMA. APPROVED FOR VETERANS TRAINING.

306 Pieces of Equipment

The locks, picks and tools you'll use in your course and in your future profession.

Plus This Professional Key Machine . . .

For quick money-making now and for years to come.
All Included With Your Locksmithing Institute Course

NEW

Special Instruction in Electronic Burglar Alarm Security Systems at no extra cost if you act now.

FREE BOOKLET

LOCKSMITHING INSTITUTE
Technical Home Study Schools — Dept. 1110-027
Little Falls, New Jersey 07424

YES, rush me your free "Opportunities in Locksmithing", plus full details on money-making opportunities, key machine and tools, sample lesson pages, tuition and easy payment plans.

NO OBLIGATION . . .
NO SALESMAN WILL EVER CALL

Name _____

Address _____

City _____

State _____ Zip _____

☐ Check here for information on Veteran Benefits.

Материал, защищенный авторским правом

Doctors Prove You Can Help Shrink Swelling Of Hemorrhoidal Tissues Due To Inflammation. Relieve Pain And Itch Too.

Gives prompt temporary relief from hemorrhoidal pain and itch in many cases.

Doctors have found a most effective medication that actually helps shrink painful swelling of hemorrhoidal tissues caused by infection. In many cases, the first applications give prompt relief for hours from such pain and burning itching.

Tests by doctors on hundreds upon hundreds of patients showed this to be true in many cases. The medication the doctors used was *Preparation H®*—the same Preparation H you can get without a prescription. Ointment or suppositories.

SURVEYING PAYS BIG

U. S. Dept. of Labor reports "openings for 26,000 Surveyors in next 10 years." Easy home-study plan guides you. Send for FREE "Surveying CAREER KIT." APPROVED FOR VETERANS.

Name _____ Age ____
Address _____
City _____ State _____ Zip _____

NORTH AMERICAN SCHOOL OF SURVEYING
4500 Campus Dr., Dept. PB017, University Plaza, Newport Beach, CA 92663

MORE POWER FOR BIG JOBS

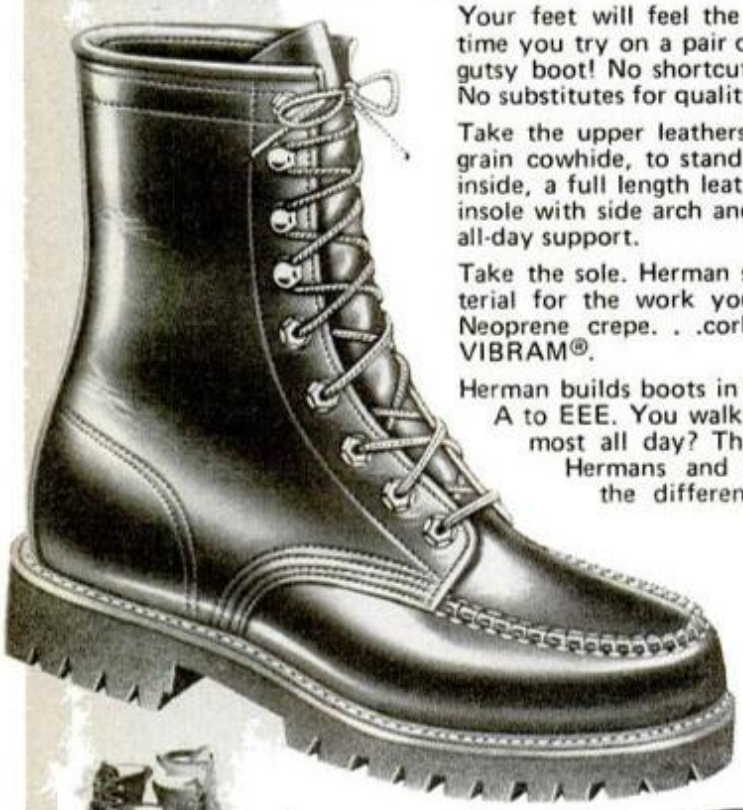
man-size **ECONOMY TRACTOR**

Mow 2-3 acres/hour, plow acreage fast. Big 14 hp engine, all-gear drive for more work-power. No belt or fluid-drive loss. Over 20 implements, 48" dozer, 32" tiller, 48" snowblower. Write:

ECONOMY TRACTOR
1005 K-2 Aroka Avenue
Waukesha, Wis. 53186

Here's How Herman Builds a Better Boot

Better in quality. Better in workmanship. Better in value. Better in comfort. And that's what counts.



Your feet will feel the difference the first time you try on a pair of Hermans. This is a gutsy boot! No shortcuts in manufacturing. No substitutes for quality.

Take the upper leathers, for example. Full grain cowhide, to stand up to the job. And inside, a full length leather covered cushion insole with side arch and metatarsal pad for all-day support.

Take the sole. Herman selects the right material for the work your feet have to do. Neoprene crepe. . .cork. . .chemigum. . . VIBRAM®.

Herman builds boots in 93 sizes and widths, A to EEE. You walk a lot? On your feet most all day? Then try on a pair of Hermans and let your feet feel the difference.

Style shown: 7184

Herman Shoes Boots

JOSEPH M. HERMAN SHOE CO., INC.
Millis, Massachusetts 02054
For free color catalog and name of nearest dealer, write Dept. 77-52

Famous HERMAN SURVIVORS® insulated to minus (-) 20 degrees.

HOW TO STOP HESITATION

(Continued from page 148)

Test fuel pump delivery next. The most accurate way is to disconnect the fuel pump-to-carburetor fuel line and install a pressure gauge. Then run the engine at specified idling speed. The pressure reading should be up to specification.

Actual pump pressure varies with the fuel pump. Some, for example, put out 3½ to 5 pounds; others, 5 to 7 pounds. Check the specs.

Without a pressure gauge, you can get an idea of fuel-pump adequacy by holding a bowl under the end of the disconnected fuel line at the carburetor. Have someone crank the engine. A good flow of fuel will more or less discount the fuel pump as the reason for hesitation.

I would advise that you test compression and the EGR system before doing the next carburetor-related tasks which involve carburetor cleaning and overhaul, especially to replace the accelerator pump and assure cleanliness of the accelerator pump circuit.

The accelerator pump supplies an extra shot of gasoline to the engine when the engine is accelerated. This offsets the gulp of air that's pulled in and would, but for the extra fuel, thin out the fuel mixture to produce hesitation on acceleration.

Test compression

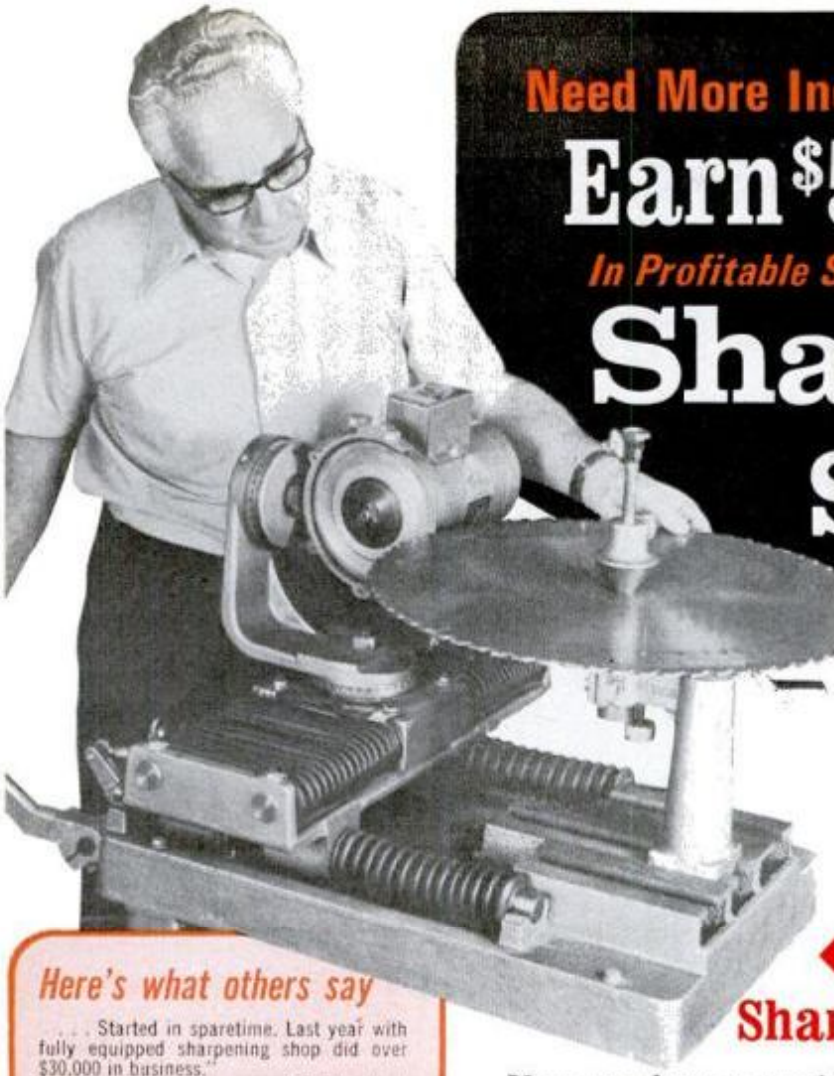
If compression in one or more cylinders is below normal, hesitation could be caused by a leaking valve. However, low compression may also be caused by blowby past rings, which would not produce hesitation.

To find out, squirt engine oil on top of the pistons in the cylinders involved and test compression again. If you get a normal reading on the gauge, the rings are probably worn. But if oil fails to increase compression, the problem is valve-related.

Mechanics who dismiss hesitation with the "emission controls" excuse are correct in one sense. A malfunctioning EGR valve can cause hesitation. It operates by vacuum and is normally closed, preventing recirculation of exhaust gases. If it gets fouled and isn't functioning properly, recirculation of exhaust gases would be increased, and excess gases would be induced into the intake manifold, upsetting the critical combustion balance during acceleration.

The EGR valve is easily checked out by clamping closed the vacuum hose from the valve to the manifold and test driving the car. If hesitation is no longer apparent, the EGR system should be serviced. ★★★

Материал, защищенный авторским правом



Need More Income? Be Your Own Boss

Earn $5 TO $8 an Hour

In Profitable Sparetime Business of Your Own

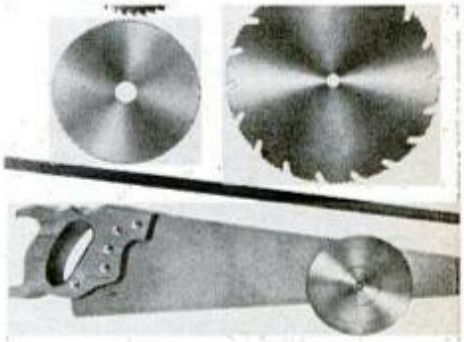
Sharpening SAWS

with Professional Accuracy

The need for precision sharp saws and tools by industry, contractors as well as handymen, is creating exceptional opportunities for the man who wants to have a business of his own. You don't have to quit your present job because you can run this service in your sparetime, on weekends, or in the evenings.

Foley Sharpening Equipment Lets You Sharpen Variety of Saw Blades

You can sharpen combination (rip and crosscut) circular saws, band saws, hand saws, crosscut circular saws as well as Carbide-tipped saw blades—and do a perfect job every time without experience or special training. The precision Foley sharpening equipment does it for you automatically! Set up in basement or garage, work your own hours in your own way and earn big sparetime profits.



EVERY COMMUNITY NEEDS THIS SERVICE. Regardless of the size of the city or small town, this service is needed. And we'll show you how to get started.

Dick and Jo Ann Koester after being in business less than a year wrote: "We have acquired another Foley Saw Filer and for the past two months we have been in full-time operation. As we live in a small town of 150 population in a farm area we use our truck to pick up saws in five nearby towns. With a family to support and plans for building to our house we had to pick up business fast and already sharpen an average of 15 to 20 saws a day. Business for the future looks even better as good machine filing is our best advertising."

Here's what others say

". . . Started in sparetime. Last year with fully equipped sharpening shop did over $30,000 in business."

F.B. New York

"An accident almost crippled me for life but thanks to Foley equipment and the training I received at your school I now have a profitable business which proves 'You can't keep a good man down'."

J.H. North Dakota

"The Foley Filer handles all my needs. For what customers were demanding of me I thought I'd need extra machines and equipment. Not so, the Foley Filer takes care of everything I need."

H.F. Pennsylvania

"Your equipment is built to last. It'll outlive me (and outwork me)"

C.W. Iowa

"I'm a 'retired farmer' at 68 but my Foley equipment keeps me busier than ever—and it's profitable too!"

L.J. Minnesota

"I started a small sharpening operation in my garage. I now have 2 other branches and several people working for me. My gross income is in the five figure bracket."

L.G. Chicago

"Who says a woman can't succeed in supposedly a man's business. I did and today I'm doing business with many industries. I just finished sharpening 55 ten food band saws."

A.A. Wisconsin

"Looking for a snow plow, I stopped in at a rental outlet. Browsing around, I noticed a power chain saw and it dawned on me that rental shops could mean extra profits for my sharpening business. Now I have extra business all of the time from rental outlets."

M.S. Vermont

"The Quality of Foley equipment has guaranteed me repeat business because I can turn out quality jobs every time. You might say, I've built my reputation on Foley's."

C.D. Colorado

Foley will Finance You

We Finance You! Foley will help you get started with minimum investment. No franchise fee. Write for complete information. No obligation.

Foley

FOLEY MANUFACTURING CO., 216-7 Foley Bldg.
Minneapolis, Minnesota 55418
CALL TOLL FREE 1-800-328-8488

Send for more information on this money-making business.

Name _____

Address _____

City _____ State _____ Zip Code _____

PHONE

Материал, защищенный авторским правом

What every stubble bum should know.

The closer you cut your stubble, the longer it takes to grow back. The longer it takes to grow back, the less likely you will look like a stubble bum before you have to shave again. Which brings us to Mennen Skin Bracer® Pre-Electric Shave Lotion. It tightens your face, conditions your stubble so you can shave extra close. It even helps lubricate your razor head, and it's got that clean Skin Bracer fragrance. Congratulations. You are soon to join the ranks of the ex-stubble bum.

CHOPPER THEY CALL WHEN THE CHIPS ARE DOWN (Continued from page 86)

over 34/2, which lacked only the broad bridge for completion. Through the bubble, Larry calmly surveyed the four corner uprights of the body and the four legs of the bridge that would fit on top of them.

"Come down, Dave," Larry said, "down a little more." The copter dropped about 10 feet. The bridge legs swayed over the body uprights.

"I've got it," Larry said, telling Dave he was taking over the controls. Before takeoff, Larry had explained to me how the aft pilot handles the plane. He has controls similar to those in the forward positions —a control stick at either side of his seat. The left stick—called the collective—provides vertical control while the stick on the right—the azimuth—controls direction and yaw. But the system, which produces electrical impulses to an autopilot, is limited to 10-percent control of the craft and can be overridden by the hydraulic controls up forward.

As adept as a juggler

Larry worked the controls almost automatically, his head bent slightly forward as he looked down between his knees. He made me think of a juggler as he delicately maneuvered the better than 40,000-pound chopper inches at a time in order to precisely control the 8000-pound, 65-foot-wide bridge dangling from cables.

He talked into the intercom almost continuously, as much to himself as to Dave: "Okay, almost there . . . down a little . . . looks good. Oh damn!" A gust of wind had moved the chopper several feet to the right.

"I've got it," Dave said, maneuvering the craft back on target again. "Okay, I've got it," Larry said. The switching of control functions was as automatic as breathing.

Larry's first task was to ease the nearest right leg of the bridge into a "V" formed by two corner guide plates attached to the body's upright. Once it was engaged, Larry would slide the bridge leg down until it rested on top of the upright. Meanwhile, he was controlling yaw motions so the far right leg would also be captured by its "V" guide. As a further aid in keeping the two bridge legs within the target area there was a metal strap—a "wraparound"—running around the body's uprights the way the ropes enclose a boxing ring. Once a leg was down in the target area, it would bounce off the wraparound as the bridge section oscillated.

First two legs drop in

Using the wraparound with skill, Larry maneuvered the chopper slightly to the right until the leg hit the "V" guide. With the chopper stable, he slid the leg into its final position. The other leg now was in its guide—and it, too, dropped into position.

Larry now changed the chopper's attitude slightly, causing the left side of the bridge to drop. With the right legs firmly in place, the two left legs rocked into the guides and slid into position. He hit a button on his right stick to open the four hooks holding the bridge cables.

"It's set," Larry told Dave, who responded with the now familiar: "I've got it." Dave banked sharply and we were headed back to the marshaling yard. "On the next one," Larry said, "let's try it from the downwind side."

The next bridge was positioned on the first try, with almost no jockeying or maneuvering. The entire operation probably took no more than a minute. Later, when I was shooting pictures from the ground, Larry worked so fast on a tower that I barely had time to squeeze off three frames before the chopper sped away again. A virtuoso performance.

Once the sections are in position, ground crews climb the towers and fix bolts in predrilled holes to finish the job. All this adds up to amazing precision when you consider the size and weight of the elements involved. The towers I saw completed stood 130 feet high and weighed some 22,000 pounds.

A major problem in using a helicopter as a crane is the tendency of the heavy cargo to swing or yaw. Sikorsky, builder of heavy-lift copters since 1953, solved the problem with a cage and spreaderbar system that damps yawing forces.

An aluminum restraint

The Erickson people have modified the original design and, they say, saved hundreds of pounds of extra weight in the process. The cage, made of heavy aluminum members, is attached under the hatch where the hoist cable is lowered. (See photo at the bottom of page 84.) At the cage's bottom is an oval-shaped aluminum ring which restricts the movement of the spreader bar.

The spreader-bar unit is shaped like a triangle. The apex—at the top —is connected to the chopper's hoist cable; the bar itself, which hangs parallel to the bottom of the fuselage, has two cables attached to each

Материал, защищенный авторским правом

end. Each cable has a cargo hook at its other end. It's a simple but effective device.

The flying crane was the brainchild of Igor Sikorsky, the helicopter pioneer and founder of the company that bears his name. A test aircraft, the S-60, was built in 1959, and an improved version, the S-64, made its first flight in 1962.

In his autobiography, *The Winged-S*, Sikorsky writes: "Crane helicopters were first used as military aircraft in Vietnam. The S-64, with its powerful engines and its ability to carry loads of any shape and size, joined the 1st Cavalry Division (Airmobile) of the U.S. Army in 1965. Four S-64s retrieved more than 100 aircraft in their first six months in Vietnam. They were also used to carry 155-mm artillery pieces—something no other helicopter could do—bulldozers, fuel bags, radar equipment and other supplies. Pods, attached to the S-64's undercarriage, carried troops . . ."

About 100 Skycranes have been produced by Sikorsky, but most are in the hands of the military. To stimulate civilian sales, Sikorsky organized—in the late '60s—a company to handle a variety of contracting jobs. As a result, Sikorsky crews installed transmission towers at sites where top sections couldn't be placed by ground cranes; airlifted prefab sections of a restaurant to a mountain ski-lodge site; delivered pipe, cement and other supplies to an oil rig in a South American jungle; and offloaded containerized cargo from a ship in the Arctic.

Lumbering by helicopter

Currently, seven of the expensive ($2.2 million) copters are with commercial operators. Erickson and Evergreen, a company in McMinnville, Ore., each own three. Tri-Eagle, a company based in Yuba City, Calif., operates one. All three operators are engaged in West Coast lumbering.

Jack Erickson, whose family has been in the lumber business since 1915, pioneered logging by helicopter. In January 1971, he tested the method using a chopper with a 7500-pound payload capacity. The results were so encouraging that he decided to try a Skycrane.

The big bird was given a severe test—logging selected timber in a 610-acre tract in the Siskiyou region of Oregon. The Siskiyou National Forest is part of the millions of acres of wilderness supervised by the U.S. Forest Service. In many of these forests there are large stands of mature trees that should be removed to encourage secondary growth. Some of the trees may even be infested.

Naming it was easy.

Mennen Sof' Stroke® Shave Cream has Lanomen® (a lanolin derivative). It lubricates your skin, so your razor shaves your whiskers without irritation.

Sof'Stroke.®

It may be impossible to get these trees out by conventional methods because the site is on a steep slope, for example, or in the heart of the forest. Too, the Forest Service does not want to mar a forest area by completely clearing vast tracts or running in a network of crude roads that will remain as scars.

Final test a success

In the Siskiyou test, selected trees were marked and felled, and a single Skycrane was used to transport them to a loading area for trucks. The big bird plucked the fallen timber in loads averaging 18,000 pounds. From Aug. 23 to Oct. 7, 1971, the Skycrane was flown six to eight hours a day during good weather. Five million board feet of timber, weighing some 27,000 tons, were harvested. The Forest Service and Jack Erickson regarded the test as a success.

Today, logging remains the bread-and butter of the Erickson operation. Transmission-line work may come and go, but each year, from April through November, two Skycranes are kept busy logging in northern California, Oregon or Washington.

From time to time, other types of contracting jobs come up. The one the Erickson people still talk about was the topping of the 1805-foot CN Tower in Toronto, the world's tallest free-standing structure. An Erickson Skycrane flown by Larry Pravecek, Dave Kohornen and Rip Green was used to put the finishing touch on the tower: the 335-foot, 300-ton communications mast.

Convincing the engineers

"That was a hot-dog job," says Larry. The Erickson pilots, who became local celebrities during the operation, don't often get a chance to show the public what they can do. Before Erickson got the job, the steel contractor had to be convinced that the helicopter was capable of doing the precision work the tower-topping called for. But the job was in the bag after contracting-company engineers watched Erickson crews set a few transmission towers.

The helicopter has proven itself as a flying crane. A military version of the Skycrane is capable of transporting 12½-ton loads. Sikorsky has a third-generation craft under development able to lift 17 tons. And that will not be the limit. Igor Sikorsky foresaw helicopters capable of transporting 50-ton and even 100-ton cargoes. If that sounds farfetched, keep in mind that Mr. Sikorsky's predictions have had a habit of coming true. ★★★

How to get rich

START YOUR OWN BUSINESS RIGHT FROM YOUR HOME— AND MAKE A FORTUNE IN MAIL ORDER!

Mail Order Beginners Get Cash by Mail!

Have you ever thought of operating a little mail order business of your own? Something you could start on a shoestring right from home in your spare time. It's a fabulous business!

Bob Carter of Newark, N.J. ran his first small mail order ad in House Beautiful magazine—offering an auto clothes rack. Business Week reported that his ad brought in $5,000 in orders. By the end of his first year in Mail Order, he had grossed over $100,000!

Another beginner—a lawyer from the midwest, sold a mail order item to fishermen. Specialty Salesman magazine reveals, "he made $70,000 the first three months!"

There is no other business where you can make a fortune so fast. Come up with a 'hot' new item . . . and WHAM!

It strikes like a bolt of lightning!

Millions of people read your ad and suddenly, you are swamped with cash orders from all over the country . . . MORE MONEY in 60 days than you could earn in a lifetime!

Like the Vermont dealer who ran one ad in Sports Afield magazine. His ad pulled 22,000 orders—over A HALF MILLION DOLLARS IN CASH!

Yes, Mail Order is the fastest-growing, most profitable business in America! And now with the population explosion . . . the huge teenage market . . . and more people moving to the suburbs — we are on the verge of the BIGGEST BOOM in Mail Order history!

Free

If you are sincerely interested in starting a lucrative business of your own ACT NOW! We can help you get rich in Mail Order just as we've helped others. Mail the coupon or send a postcard. We'll send you a free book, catalog, ads and complete facts about our offer. No salesman will call. No obligation. You don't need previous experience but you must be over 21. Write to:

Mail Order Associates, Inc., Dept. 342
Montvale, New Jersey 07645

Mail Order Associates, Inc., Dept. 342
Montvale, New Jersey 07645
Please rush full details immediately.

*Name*_____

*Address*_____

*City*_____

*State*_____ *Zip*_____

TURNED ON BY THE SUN

(Continued from page 114)

velops temperatures of 2000° F. within the area of the focus spot provided by a Fresnel lens.

A Fresnel lens is a flat, thin piece of plastic with a series of small, concentric stepped zones molded in. The zones extend out from the center to the edge, with each groove being a minute refracting facet that is capable of bending light. The transmittance of a Fresnel lens (its ability to pass light) is increased more than that of a conventional lens having the same focal length. The world's largest Fresnel lens, which sells for $3000, is shown on page 112.

The solar furnace can be used as the basis for using the sun to solder and braze. You can employ it to temper small flat springs, to fire enamel on jewelry and to make a barbecue grill. It sells for $59.95.

■ **Portable solar cooker**—This is a device that reflects the heat of the sun off a foil background onto any kind of food you can put on a skewer. It sells for $13.95.

■ **Solar reflector**—Instead of foil, this is an all-aluminum reflector that catches and reflects the sun's heat onto a metal pot you can hang on an extension arm. In the pot? Water, soup or any liquid you want heated. Price without pot is $22.95.

■ **Solar oven kit**—This is an offshoot of the solar reflector. It is a parabolic reflector that catches the sun and directs heat on a test tube. You can boil water in it or use it for science projects. It's $3.25.

■ **Solar cigaret lighter**—This is the smallest of the parabolic units. You stick a cigaret on the holder, with the end to be lighted facing toward the reflector. In seconds, the 3x4 inch oval plate generates enough heat to light your cigaret—if there is sun. The lighter sells for $1.75.

■ **Portable solar water heater**—This is a practical device if you go camping where there is sun but no hot water. It provides 10 quarts of water heated to 100° F. in less than three hours on a 70° day. The vinyl bag is filled and placed in the sun. The unit is equipped with a hose and small aluminum spray head, so you can shower. The price is $9.50.

All these products use sunlight as an energy source. With few exceptions, they aren't overly sophisticated although they do the job for which they were developed.

Remember that only 15 years ago the cost of solar cells was $500 per watt. Today, that cost is about $15, and it seems to be dropping about 20 percent a year. So be patient. More new products are on the way. ★★★

FREE OUTFIT STARTS YOU IN BIG MONEY SHOE BUSINESS!

Run your own profitable 'shoe store' business **from home** in spare or full time. We give you—**FREE**—complete Starting Outfit that makes you **$217.00 EXTRA each month for just 2 easy orders a day.** You feature 350 fast-selling dress, sport, work shoe styles for men and women. Air-cushion shoes, many other special features! Sizes 4½ to 16—widths AA-EEEE. Draw on 300,000 pair stock. Earn prizes, bonuses, shoes for yourself—even a new car or color TV! Rush postcard for your FREE Starting Outfit today . . . Now!

MASON SHOE, Dept. G-684 CHIPPEWA FALLS, WIS. 54729

Be a MOTORCYCLE Mechanic in 90 Days

AMERICAN MOTORCYCLE INSTITUTE 77-2-51
1445 Skytrooper Rd., Daytona Beach, Fla. 32015
Phone Toll Free 800-874-0645

Name_____ Age_____
Address_____
City_____ State_____ Zip_____
Phone ( )_____ Vet____

At Last a New Amazingly Simple
GAS TURBINE
JET ENGINE

Build from easy to follow plans. Length 15", Dia. 8½", Wt. 15 lbs. Fuel: Gasoline or Kero.
"Screaming Demon" develops 20 H.P. Ideal project for serious-minded hobbyists, students; scientific and industrial arts classes. Make on 9" metal cutting lathe with milling attachment. For use on small racing boats, midget cars, etc. Full size assembly drawings with critical dimensions, bill of materials and photos. Price $5.00. No C.O.D.
SAVOY SCIENTIFIC, 1510 26th St., Box 1398 SANTA MONICA, CALIF. 90406

LEARN SMALL ENGINE REPAIR
at home in spare time-quickly!
Good Business-Great Hobby!
10c BRINGS BOOK, FULL FACTS
MODERN SCHOOLS
4225 N. BROWN AVE. DEPT. PM SCOTTSDALE, AZ 85251
EARN WHILE YOU LEARN

LEARN MEAT CUTTING
Train quickly in 8 short weeks at Toledo for a bright future with security in the vital meat business. Big pay, full-time jobs—HAVE A PROFITABLE MARKET OF YOUR OWN! Time payment plan available. Diploma given. Job help. Thousands of successful graduates. OUR 54th YEAR! Send NOW for a big new illustrated FREE catalog. No obligation. G.I. approved. NATIONAL SCHOOL OF MEAT CUTTING, No 71-02-01977, Dept 50-P, 33 N. Superior, Toledo, Ohio 43604.

MAKE MONEY! REPAIR HYDRAULIC JACKS

Earn while you learn at home. Millions of jacks in gas and auto service stations, trucking firms, body shops, riggers, factories and farms need servicing . . . most of which you can learn to repair. We show you HOW. Start spare time in your basement or garage. Big opportunity for mechanics. ACT NOW! Write for Folder No. PM-14, and free bonus offer
Hydraulic Jack Repair Manual Co., Inc.
G. P. O. BOX 3 • STATEN ISLAND, N.Y. 10314

Repair any watch
. . . LEARN AT HOME
Unique Sweazey System develops your watch repair skills step by step at home in spare time. No previous experience needed. Low tuition. Free sample lesson and full information.
CHICAGO SCHOOL OF WATCHMAKING
Dept. 127, Fox River Grove, Ill. 60021

PERMANENT RUSTPROOFING
FOR CAR OR TRUCK Instructions for a unique do-it-yourself rustproofing system using simple hand tools and locally available material which will provide permanent protection for both body and frame. As proof the author owns and still uses a 1953 Studebaker pickup in northeastern Ohio which has been in constant use for 24 years, has never been stored inside, and except for some rust damage which was repaired in 1957, rustproofing followed, has suffered no further deterioration of body or frame. $5.00 will provide the how-to. For $5.50 will include a current photo of the truck.
L. F. Schumann
R.D.4, Geneva, Ohio 44041

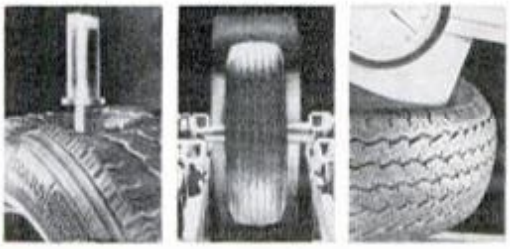
BE A BURGLAR/FIRE ALARM EXPERT

Learn at home how to install burglar/fire alarm systems in cars, homes, businesses. Big money. Growing demand with increased crime, violence, car thefts, arson. Nationally accredited course. Simple, clear, hands-on training, tools furnished. FREE facts by mail. No salesmen. Write **SECURITY SYSTEMS MANAGEMENT SCHOOL, Div. Tech. Home Study Schools, Dept.** 7110-027 **Little Falls, NJ 07424.**

Материал, защищенный авторским правом

Sears RoadHandler. Better after 40,000 miles than Federal standards say a new tire has to be.

Sears believes in giving you the facts about its tires. Here are the "Proof of Performance" facts about Sears best Steel-Belted Radial.
With 40,000 miles of relentless day and night driving already behind them, four Sears RoadHandlers set out to tame the rugged 2,000 mile route of the old Pony Express.



The warm-up over, we put them to the real test: Department of Transportation Federal Motor Vehicle Safety Standard 109 for *new* tires.

Results? Sears RoadHandlers exceeded every government requirement, *e.g.* for strength, heat resistance and bead unseating (keeping the tire on the rim in hard turns).

Even when subjected to X-ray examination of the complete tire, these RoadHandlers showed no failure of any kind anywhere.

No wonder they're Sears best Steel-Belted Radial.

15% better wet cornering than Sears original Steel-Belted Radial.
A new wet cornering traction record for Sears tires! Under carefully controlled laboratory conditions at Calspan Tire Research Facility, Sears RoadHandler beat (by an impressive 15%) the original Sears Steel-Belted Radial that beat the Baja.

Two reasons why: 12.5% more rubber meets the road for quicker, surer stops. And more water is channeled along 5 tread grooves instead of 4 to help prevent *hydroplaning* (skidding on the thin film of water between a rainy road and the tire's surface).

Sears
Tire and Auto Centers and Catalog.

"Straight talk, good values and satisfaction."

© SEARS, ROEBUCK AND CO., 1977.

Make $15 An Hour

60 day FREE TRIAL

WITH YOUR OWN SAW AND TOOL SHARPENING BUSINESS

Save 1/2 the cost of other machines

Operate in your basement or garage, part-time or full-time. Requires no selling - no costly inventory, and people come to you over and over again. Gain security without worry about recessions or lay offs.

- No experience needed - make money from the start.
- Almost all profit - no inventory - no selling.
- The finest equipment - at far less cost.
- Complete instructions & selling aids - we can even finance you.

Send today for FREE information - no obligation

TREYCO 114 Treyco Bldg., No. Tonawanda, N.Y. 14120 Phone: 716 / 693-6525

FINEST IN SAW SHARPENERS FOR 30 YEARS

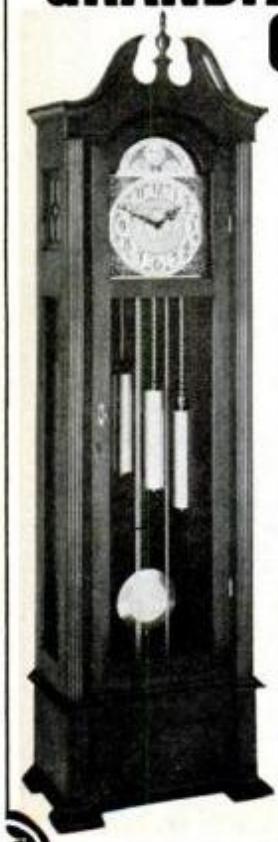
Cruise Director.

Enjoy a new sense of direction and get lost less often with an Airguide auto compass. Model 1601 (shown) is self-illuminated . . . has adjustable compensators and adhesive mount. At retail stores. Write for catalog A.

Airguide
2210 Wabansia Chicago 60647

Build Your Own Pre-Cut

HEIRLOOM GRANDFATHER CLOCK



Compare feature by feature

- Solid 3/4" kiln dried wood
- All parts precision pre-cut, mitred and dowelled
- Lumber sanded on all sides
- Fully Assembled/ precision-made West German movements
- All hardware included - even screws

Write now for FREE Color Brochure of complete line of Grandfather and other clocks.

HENTSCHEL CLOCK COMPANY
Department 702-F
16 Atlantic Avenue
So. Dennis, Mass. 02660

Duchess CURIO CABINET KIT

SOLID 1" OAK
$84. Reg. $119.50

SOLID 1" Honduras MAHOGANY
$99. Reg. $139.50

Add $10. per kit for pre-cut miters.

- All mortises and tenons pre-cut.
- All pieces pre-sanded.
- All hardware furnished.
- Complete assembly drawings and easy to follow detailed instructions.
- Glass, mirror and glass shelf dimensions included.
- 30-day money-back guarantee.

5'8"H x 12" D
12" Width
13½" front & sides
Oak 64 lbs.
Mah. 50 lbs.

SOUTHERN MOBILE INDUSTRIES
Dept. 132 - Bay Minette, AL 36507
Personal Checks Accepted:

__ Oak Curio Cabinet Kit(s) @ $84. ea.
__ Mahogany Curio Kit(s) @ $99. ea.
__ Pre-cut miters $10. per kit.
__ Curio Light Fixture(s) @ $10.95 ea.

BankAmericard - Master Charge orders
Phone collect 205-937-2416
Alabama Residents Add 4% Sales Tax
U.P.S.—Shipping Charges Collect

SEND $1.00 FOR COLOR CATALOG of the SMI Family of Quality Furniture Kits & Finished

The best known general purpose paint and varnish remover for stripping old finishes from wood surfaces.
Offers you scrape-off or wash-off sludge removal option. Available in pints, quarts and gallons where paint is sold.

Our 102nd Year

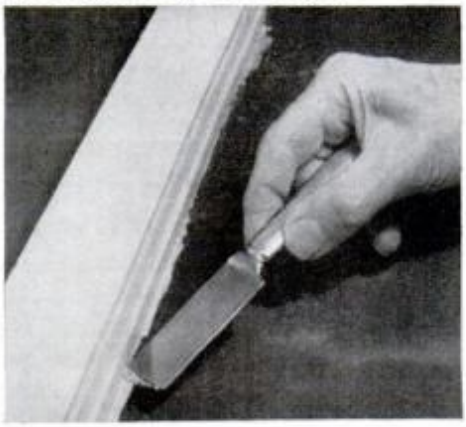
SAVOGRAN

P.O. Box 130, Norwood, MA 02062

HINTS

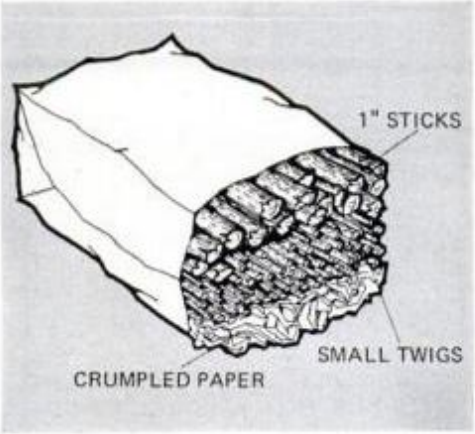
FROM READERS

Knife makes good scraper



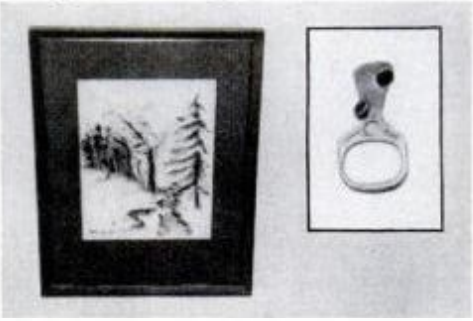
Turn an old steel table knife into a scraper, putty knife or spatula. Cut off half the blade and file a bevel on the end.—*Walter E. Burton*

Fireplace starter bags



Make starting a fire easier. Paper grocery bags filled with twigs, 1-in. sticks and wadded paper form the foundation for a lively fire. Just touch a match to the bottom of the sack to start it.—*Richard Curwin*

Tab picture hanger



Pull tabs from beverage cans make good picture hangers when they are nailed to the wall. The tab rings swivel, allowing for picture adjustment.—*Roy Zolesky*

Материал, защищенный авторским правом

A Significant Breakthrough in the Fight Against the Effects of Aging

HERE ARE THE AMAZING FACTS ABOUT THE MOST TALKED ABOUT DIET OF OUR TIME

The "No-Aging Diet" is creating a sensation. Recently, a national magazine and newspapers reported that a high nucleic acid diet can:

Cause wrinkles to disappear...
Make some individuals look 10 to 15 years younger...
Reduce breathlessness and fatique...
Combat acne, ugly brown 'age spots', and other skin ailments...
Promote good health and general sense of well-being...

Hailed by doctors as the "scientific breakthrough of our time," RNA (Ribo-Nucleic Acid) is opening up exciting new possibilities in the fight against the effects of aging and disease.

And now you can increase your RNA intake without a special diet. The secret is a convenient, easy-to-take dietary supplement called RIBOMINS.

RIBOMINS= RNA + ESSENTIAL VITAMINS AND MINERALS

Ribomins are the "total vitamin tablet." Four tablets a day provide 180 mg. of RNA —and a whole lot more.

Taken as directed, Ribomins give you the full U.S. Government recommended Daily Allowance of seventeen vital Nutrients, including Vitamin A, Vitamin C...Vitamin E... Iron ...Magnesium... Vitamin B-6...Zinc and 10 others, All natural and organic.

AND RIBOMINS CONTAIN NO SUGAR.

This safe and effective supplement may significantly contribute to your family's health and resistance to flu and other illness

WILL RIBOMINS WORK FOR YOU?

If you are between 20—60 years of age, a major medical authority reports that RNA can significantly contribute to making you feel more energetic, can help your skin to look it's healthiest, and can make you feel younger more alert, and alive.

If you are over 60, RNA can help you feel dramatically better— even if you suffer from arthritis, emphysema, diabetes, or other aging complications.

Will RIBOMINS work for you? Every individual is different and only you can judge. But you can try RIBOMINS without risk— and make up your own mind. See the results yourself. Then decide.

NO- RISK, MONEY- BACK GUARANTEE
Order your supply of RIBOMINS tablets now. Take them as directed for 21 days. If, in 21 days, you don't see or feel the differance, if you are dissatisfied for any reason whatsoever, simply return the unused tablets and your money will be refunded.

REPORTED IN MEDICAL JOURNALS AND MAJOR NATIONAL MAGAZINES

MAJOR HEALTH JOURNALS REPORT ..."The most immediate effect observed in dosages as low as 30 mg. of RNA daily was an increase in energy and well being. Reports disclose that the most striking effects were observed on the skin of the face. the first results observed were a healthier, rosier appearance and an apparent smoothing of the skin of the face. After one or two months of treatment, lines and wrinkles began to diminish."..

U.S. PUBLIC HEALTH SERVICE ACUTE COMMUNICABLE DISEASE CONTROL DIVISION reports....

"RNA and DNA are presently available and, according to U.S. Health Service reports, are potent interferon stimulators ...interferon inhibits the growth of essentially all viruses...."...

"Investigators have observed changes in mental function, especially in improving memory, with RNA treatment."

"AMAZING"..."EXCELLENT" SAY SATISFIED RIBOMINS USERS.

V.H. Raimo, M.D. • Clark, N.J.

"... six months ago I could just about work eight hours a day at the office. I can now do 12 hours with no problems. The only nutritional agent I have taken is Ribomins, four daily. These have helped me tremendously"..

The foregoing facts reported by satisfied Ribomins users are reported only to demonstrate the results claimed by the the user. They do not represent benefits which all users may enjoy. Each of us is different and only you can judge the results for yourself.

Barbara Reid- "Bank Teller"

..."It's so terrific, my complexion has improved. I feel great and at the end of a work day I'm still full of pep."

"RIBOMINS"
P.O. Box 382
Linden, New Jersey 07036

SAVE TIME... PHONE TOLL FREE OR MAIL COUPON

RIBOMINS
Dept.PM-2,516 Fifth Ave.,
New York, N.Y. 10036

YES! I want to discover the vitality of youth and younger, healthier complexion that RIBOMINS can bring.

Please rush my supply under terms of your no-risk, money-back guarantee. If I am not completely satisfied, I may return the unused tablets for a full cash refund.

Please send:
☐ 100 Tablet Supply of RIBOMINS— for $10.00
☐ 300 Tablet Supply of RIBOMINS— for $25.00

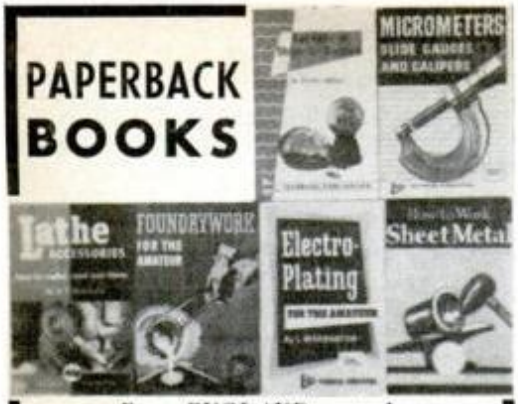
(Please add 75c to each order for shipping and handling. Outside Continental U.S.A. add $1.25. No COD's, please.)

TOLL FREE CREDIT CARD ORDERS
800- 327-8912
24 hours a day
(In Fla., 1—800-432-5024

☐ Master Charge ☐ Bk. Amer
Acct. No. _____
Inter Bank No. _____
Expiration date _____
Name _____
Address _____
City _____
State _____ Zip _____

Материал предоставлен Российским музеем

PAPERBACK BOOKS



From ENGLAND on tools and things to do in your shop.

- ☐ FOUNDRYWORK FOR THE AMATEUR On making your own castings in your backyard .. $3.50
- ☐ HOW TO WORK SHEETMETAL with homemade tools 4.00
- ☐ ELECTROPLATING FOR THE AMATEUR .. 3.50
- ☐ VIRGINIA—building a live steam locomotive you can ride behind—almost a 'cookbook' 10.95
- ☐ SECRETS OF SHIPS IN BOTTLES 2.75
- ☐ MICROMETERS, SLIDE GAUGES & CALIPERS 2.00
- ☐ LATHE ACCESSORIES, HOW TO MAKE AND USE THEM including some new designs 3.50
- ☐ CLOCKMAKING FOR THE AMATEUR 9.95
- ☐ BEGINNER'S WORKSHOP—everything you need to know to set up a shop 7.00
- ☐ THE STORY OF A STANLEY STEAMER ... 5.00
- ☐ GIANT 1977 CRAFTSMANSHIP CATALOG, 64 pages of books, tools, & projects. FREE with order or 1.00

CALDWELL INDUSTRIES
609 E. Davis St., P. O. Box 170
Luling, Texas 78648

NAME

ADDRESS

THE ORIGINAL

Top Line

CRACKS · METAL · WOOD · HOLES · PLASTIC · DENTS · CONCRETE · FIBER GLASS · DRYWALL · PLASTER

30 MINUTE REPAIRS

rapid repair

SUPER FILLER

THE ONE FILLER FOR ALL HOME REPAIR NEEDS

SPREADS LIKE PUTTY
READY TO FINISH IN 30 MIN.

Rapid Repair Super Filler is a space-age plastic repair material that enables the do-it-yourselfer to make filling repairs in 30 minutes. You'll find hundreds of uses for this versatile product in and around your home.

CHECK THESE FEATURES:

Changes from putty to ready-to-finish in 30 minutes.
Color change mixing insures proper mixing every time.
Rapid Repair Super Filler will only set up when mixed with hardener—will not dry in can.
No special tools needed to make repairs.
The one product for all your filling jobs.
Rapid Repair takes all paints and finishes.

For FREE Booklet send self-addressed, stamped envelope today to:

Oatey CO., CONSUMER PRODUCTS DIV. DEPT. P, CLEVELAND, OHIO 44135

OLDSMOBILE CUTLASS

(Continued from page 89)

they'd like to see in their cars. Some have already been made in 1977 models; some haven't. Here's a sampling.

"Doors should be made thinner. They're too heavy on the coupe."—Arizona retiree. And a New York policeman: "Reposition the spare tire to allow more space in the trunk."

A common complaint from a New York artist: "Add front vent windows and get rid of that drafty ventilation system with the fan always running." A Tennessee warehouseman: "Fenders need to be redesigned so wheels don't toss rocks up against the lower body."

More suggested improvements: "They ought to put on thicker paint," recommends a Michigan printer. "I had some blotches on the hood. Three swipes with rubbing compound and I was down to the primer."

An Illinois electrician: "Less plastic." A Minnesota marketing manager: "Change to front-wheel drive." A Dallas salesman: "Gauges instead of idiot lights." And an Army captain from Key West: "The hatch roof needs a much larger rain gutter. Water pours in from the roof when you open the doors."

Workmanship draws a plus

What about Oldsmobile workmanship? When Olds builds you a car, it apparently does it well, because 74.5 percent of our owners rated workmanship good to excellent. Typical comments ranged from "... the Cutlass is the best vehicle I have bought in several years," to "... good workmanship except for some minor paint spots," and "... the workmanship is so bad inside and out that GM should insist on its workers taking a little more pride in their work."

Regarding service, only 38.8 percent of Cutlass owners had any need to take their cars to the shop in the miles they'd racked up thus far. Of those who needed service, 57.3 percent were pleased with dealer repairs. Here's a cross section of service experiences.

"The carburetor wouldn't hold a smooth idle," says a New York architect. "I took it back eight or nine times. Very sloppy mechanics—grease all over my seats. Things got worse. I finally had my service station repair it."

A Missouri house painter: "We needed some body work done because the car was delivered with a dent

(Please turn to page 160)

"4-in-1 workhorse*" molder, planer, edger...

Convert waste and rough-sawn material to dressed lumber, free of wave and chatter marks. Plane boards up to 14" wide. Plane down to 1/16".

Quickly switch from planing or edging to molding. Select from 41 sets of stock molding knives.

Use for picture frames, miniature doll furniture, models, dozens of other workshop tasks.

*As described by Popular Mechanics, November, 1976, page 128.

WILLIAMS & HUSSEY MACHINE CORP.
DEPARTMENT 2, MILFORD, NH 03055
TEL. 603-673-3446

ORDER NOW. Satisfaction guaranteed.
I enclose check or money order in amount $_____

Charge my
☐ MASTER CHARGE ☐ BANKAMERICARD
Give card info & expire date.

(W & H Molder-Planer will be shipped to you from New Hampshire via truck; wt. 84 lbs. Pay shipping charge upon receipt.)

☐ Handfeed Model W-7 @ $269.00
☐ Power Infeed Model W-7PF @ $360.00
☐ Power In-and-Outfeed Model W-7S @ $415.00

Name _____
Street Address _____
City _____ State _____ Zip _____

Send for free illustrated brochure PM 2-77

Материал, защищенный авторским правом

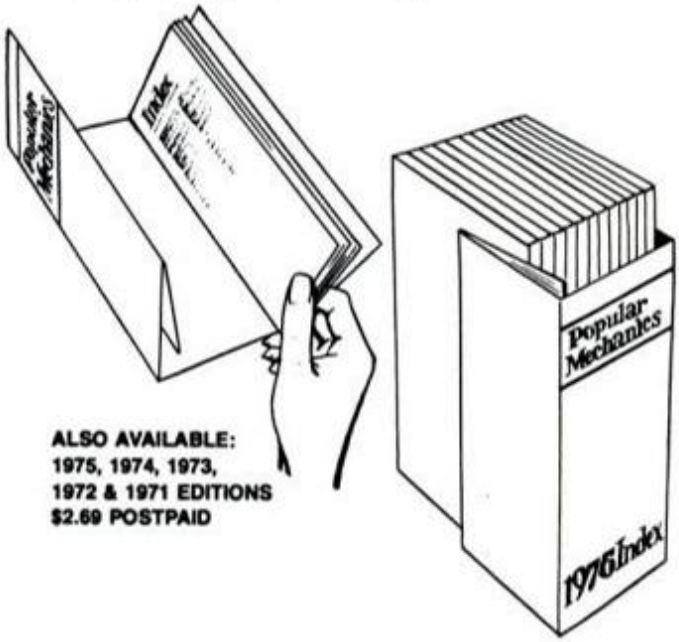
SPECIAL PREPUBLICATION OFFER

ANNOUNCING

1976 INDEX & SHELF WRAPPER

Here's a great idea that will multiply the value of your back issues of PM. Find any article you want in seconds.

Want to find an article on a rolltop desk you can build yourself? How to pick and install the best CB car antennas? How to repair electric coffee percolators, overhaul drum brake systems, patch cracks and potholes in your asphalt driveway?



ALSO AVAILABLE:
1975, 1974, 1973, 1972 & 1971 EDITIONS
$2.69 POSTPAID

Your copies of Popular Mechanics are crammed with this type of information. Sometimes, though, it can be frustrating to find an exact article that you recall appeared several months ago.

The Popular Mechanics *1976 Index and Shelf Wrapper* solves that problem. Each of those thousands of items that appears in PM throughout the year is not only referenced, but thoroughly cross-referenced as well. You can find *any* article you want in seconds! Or you can find *all* the articles on broad categories such as auto repairs, boats, drills, photography, woodworking and other subjects at a glance!

Best of all, the *Index* is bound into a handsome wrapper made of heavy board. The wrapper precisely encloses the 12 issues which are cross-referenced in the *Index*, and makes a beautiful and useful addition to your bookshelf.

The entire package — *Index and Shelf Wrapper* — is yours for only $2.69 postpaid.

Send for your copy today! You'll be happy you did.

Send Check or Money Order to:

POPULAR MECHANICS INDEX, Box 1014, Radio City, N.Y. 10019

Please reserve the 1976 Index & Shelf Wrapper and rush it to me as soon as it is available in early 1977. Also send me immediately the ☐ 1975 ☐ 1974 ☐ 1973 ☐ 1972 ☐ 1971 Index-Wrappers as checked. I enclose $2.69 postpaid for each index ordered.

Name _____

Address _____

City _____ State _____ Zip _____

Материал, защищенный авторским правом

I Earn $8 An Hour Repairing Lawn Mowers In My Neighborhood

Repair and tune-up any lawn mower

Start Making Money At Once...

Foley's NEW Lawn Mower Repair Program lets you make money right away. All the equipment you'll need to operate a successful business plus information on how to tune-up an engine will be sent at once. Everything is written in easy-to-understand, non-technical language with many helpful illustrations. Receive the equipment and repair information one day...open for business making money the next. Operate from your garage, tool shed or shop.

Millions of Homes in United States

Most homes have lawn mowers. So do many businesses, golf courses, city and park maintenance departments, farmers ...the list is almost endless. Each of these lawn mowers requires periodic resharpening and repair. You can cash in on the big profits with a service business of your own.

800-328-8488

No Franchise Fee. No Money Down.

Foley MANUFACTURING CO.
216-7M Foley Bldg.,
Mpls., MN 55404

Please rush me more information about Foley's Mower Program.

Name _____

Address _____

City _____ State _____ Zip Code _____

Phone

ABRASIVE CORDS & TAPES

FOR **POLISHING** AND **BURRING** SMALL HOLES, SLOTS, DIES, ETC.

"The Machinist's Friend" • Useful in many ways.

AVAILABLE ON 25 YARD SPOOLS.
PLEASE ORDER BY NUMBER

CORDS AND TAPES

No.	App. Dia.	Grain	Alum. Ox.	Crocus	Sil. Car.
46	.150	120			46-S
47	.125	120			47-S
48	.093	150	48		
49	.082	120	49	49-C	49-S
50	.070	180	50	50-C	50-S
51	.055	120	51		51-S
52	.055	150	52	52-C	52-S
53	.040	180	53	53-C	53-S
54	.030	220	54	54-C	54-S
54-H	.025	220	54-H	H-C	
55	.018	220	55	55-C	
60	.015	220	60	60-C	
66	.012	280	66	66-C	
01 Tape	2-32	180	01		01-S
56 Tape	3-32	180	56	56-C	56-S
57 Tape	4-32	180	57		57-S
58 Tape	6-32	150	58		58-S
59-Tape	8-32	150	59	59-C	59-S

ALUMINUM OXIDE OIL CORDS

No.	Approx. Dia.	Grain	No.	Approx. Dia.	Grain
3	.025	180	5	.035	180
4	.030	180	6	.040	180

E. C. MITCHELL CO., INC.
86-88 BOSTON ST., MIDDLETON, MASS. 01949
Telephone (617) 774-1191

USE ZIP CODES WHEN ANSWERING ADS

X-RATED ENTERTAINMENT CENTER....

YOU CAN SEE THROUGH IT !! •SIMPLICITY OF DESIGN TO FIT EVERY DÉCOR •HOLDS TV, BOOKS, STEREO, PLANTS, ETC. •FULL-LENGTH MAGAZINE RACK •7'-0" HIGH X 10'-6" LG. X 16" DEEP •EASY BUILDING & ASSEMBLY FOR UNDER 100.00

THINK OF THE MONEY TO BE SAVED BY DOING IT YOURSELF....BE THE ENVY OF YOUR NEIGHBORHOOD !!

3.00 FOR "EASY TO READ" PLAN NO. PM-3771
•MICHIGAN RESIDENTS ADD 4% SALES TAX • NO C.O.D. ORDERS, PLEASE.

INDUSPECIALTIES OF MILFORD
P.O. BOX 145 MILFORD, MICHIGAN 48042

MOLDS

for making Ornamental Concrete Items...

Book about Aluminum Molds with prices and production trade secrets direct from world's largest mold manufacturer.

SEND $5.00

CONCRETE MACHINERY COMPANY, INC.
P. O. BOX A99 - HICKORY, N. C. 28601

NEW! JET ENGINE
BUILD GS-2 SMALL JET ENGINE

★ POWER your Glider, Small Plane, Helicopter, Hang-Glider, Hovercraft,
● "EASY-TO-BUILD" CONSTRUCTION PLANS:
15-LB. THRUST JET-WT 5-Lbs. PLANS ... $12.00
40-LB. THRUST $16.00 ★ 80-LB ... $19.95
For Complete INFORMATION Package, 5-LB ... $6.95
Including GS-2 Technical Handbook (Illustrated), Graphs.

SEND $5

EMG ENGINEERING CO.
18518-H SO. BROADWAY, GARDENA, CAL. 90248

OLDSMOBILE CUTLASS

(Continued from page 158)

on the door, damaged in transit. The dealer did this work promptly and well."

A Wisconsin hospital clerk: "My car had some unusual problems. It was delivered with a burnt-out transmission and one bad sparkplug. The dealer took a week to replace the tranny and three months to diagnose the bad plug. All was done under warranty, however."

And a Michigan purchasing agent: "Heater not working, and keys stuck in ignition. Dealer corrected both problems the same day; no charge."

Owners like resale value

Several owners praised the Cutlass's resale value, giving this as one of their reasons for loyalty to Oldsmobile. Noted a Michigan teacher: "My previous car was a 1974 Cutlass S, which I bought for $3700 and sold two years later for $3200. That's hard to beat!"

An unemployed Michigander remarked, "It's a good car—probably the best one I've ever had or ever will have." A New York housewife: "The Cutlass has every nice feature of my friend's Cadillac, but without the bulk and weight." A Texas construction supervisor: "Looks and rides like a more expensive car, and the inside is great."

Will Cutlass owners buy another? Nearly 90 percent say yes, especially if the car isn't made smaller. If it is, and that seems quite likely, loyal owners will probably switch to Delta 88s. ★★★

HOT DOGGING IT IN THE BULLRING

(Continued from page 81)

odd angle, a good two or three feet from where it's supposed to be. He'll have an interesting week in front of him.

It's all over

For this night at least, it's all over for Ross. Later, we head for the pit area and he shakes his head as he sees us approach.

"I'm not sure what—I can't get at it just yet—but something let go as I was halfway into the turn and it just jerked me into the wall."

We extend our sympathies, assure him of our confidence in, and hope of, his eventually winning, and again say how sorry we are, how rotten his luck.

"Look," Ross says, his eyes sweeping the dimly lit pit area, "that's racing." ★★★

Материал, защищенный авторским правом

FREE! INVENTORS Information Kit!

Important Information Every Inventor Should Have for the Developing, Protection & Marketing of Inventions & Ideas

INVENTOR'S "LINK TO INDUSTRY"

Have you an invention or idea that's crying for development and presentation to a prospective manufacturer? **Now you can do something about it.** Send for our Free INVENTORS INFORMATION KIT No. A-194 today! In addition to telling you how your invention or idea may be protected, developed, publicized and negotiated for cash sale or royalty licensing, it includes an **Invention Record Form,** a **Product Marketing Brochure,** and a special **Directory of 500 Corporations Seeking New Products.**

When you contact the Raymond Lee Organization, the inventor's "Link to Industry," you're talking to **"the idea people"** who presented **over 2,000 inventions to industry in 1975 alone**...professional invention developers with over a decade of experience, integrity and performance. **Fees are charged only for contracted services.** Remember ...the INVENTORS INFORMATION KIT is yours without cost or obligation. Find out how you may put your invention or idea to work for you. Mail coupon NOW!

RAYMOND LEE
President
B.S. Industrial Engineering
Former U.S. Patent Office Examiner

Raymond Lee Organization, Inc.
230 Park Avenue, New York, N.Y. 10017
Phone **(212) 686-8500**

Yes, I'd like to find out how to take action on my idea. Please send me your FREE "Inventor's Kit" A-194

MAIL NOW!

Name _____
Address _____
City _____ State _____ Zip _____
Phone No. _____ Area Code _____

MAKE EXTRA $$$ EVERY DAY!

Get into the big, year-round
EXTRA MONEY BUSINESS
that's EASY to learn—EASY to do—
and EASY ON YOU!

Be a LOCKSMITH!

You Can Make Up to $10 an Hour
—even while learning! Train FAST at Home!

Never before have money-making opportunities been so great for qualified Locksmiths. Now lucrative regular lock and key business has multiplied a thousandfold as millions seek more protection against zooming crime. **Yet there's only one Locksmith for every 17,000 people!**

Start Collecting CASH PROFITS Right Away

You're "in business" ready to earn $5 to $10 an hour a few days after you begin Belsaw's shortcut training. Take advantage of today's unprecedented opportunities in Locksmithing for year-round EXTRA INCOME in sparetime—or fulltime in a high-profit business of your own. Hundreds we've trained have done it. So can YOU! All tools **plus** professional Key Machine given you with course. These **plus** practice materials and equipment, **plus** simple, illustrated lessons, **plus** expert supervision, **plus** business-building guidance will enable you to KEEP THE MONEY COMING IN! Ideal for retirement—good jobs, too.

SEND FOR EXCITING FACTS—No Obligation

Discover what's in Locksmithing for you—how Belsaw's master-locksmith-approved training can give you the skill you can depend on to EARN MORE—ENJOY LIFE MORE. Just fill in and mail the coupon below to receive full information by return mail. Do it TODAY!

BELSAW INSTITUTE, 107F Field Bldg., Kansas City, Mo. 64111
Accredited Member National Home Study Council

THIS PRO KEY MACHINE YOURS TO KEEP

can add $25 to $40 a week to your income...and it won't cost you a cent with your training!

ALL TOOLS, MATERIALS AND PRACTICE EQUIPMENT COME TO YOU WITH YOUR COURSE.

FREE

Tells how to make money in Locksmithing almost from the start!

MAIL THIS COUPON—NO SALESMAN WILL CALL

BELSAW INSTITUTE 107F Field Bldg.
Kansas City, Missouri 64111

Please send me free of cost or obligation your publication "Keys to Your Future" on how Belsaw can quickly train me to make money in Locksmithing and how all tools and Key Machine are given me to keep.

Name _____
Address _____
City _____ State _____ Zip _____

Материал, защищенный авторским правом

THE NO SPRAY WAY TO CONTROL WETNESS ALL DAY

Switch to a Roll-On with a clinically tested formula that provides effective 24 hour odor and wetness control.

OLD SPICE® Roll-On Anti-Perspirant.

Quick drying man-sized protection comes out of that big ball applicator.

All that and our great OLD SPICE fragrance.

So make the switch!

Protect yourself like a man.

Old Spice®

PROTECTION YOU DON'T HAVE TO CHECK.

SHULTON

 (Continued from page 100)

(see glossary. A hand-held terminal with a similar keyboard and display is now available, at $96, for the SC/MP.

KIM-1 also has an interface for bulk storage on a cassette recorder of programs not currently in use.

Fully clothed computers

Though it has a bare-board look, the E&L MMD-1 Mini-Micro ($350) is a lot more machine. There's a power supply beneath the board, and a keyboard and display atop it.

But this keyboard and display are different. The numbers on these keys just go up to 8—you program this computer in octal (see glossary). And the display isn't a row of numbers like a calculator's: It's a string of LEDs.

Reading a string of lights to get a number may not be natural to you, but it's very natural for a computer, because a computer thinks in "binary" (see glossary)—numbers made up of individual "bits" which can only have the valves of "0" or "1". Those ones and zeros can be symbolized by "on" and "off" LEDs. Converting binary in your head to match the octal keyboard is easy, but converting to decimal numbers is a lot harder.

The two Altairs have similar rows of LEDs. But instead of keyboards, they have a switch for every light; you enter programs in binary by

Glossary of terms

Binary—A number system based on powers of two and having only two digits, "1" and "0". Operations inside the computer take place in binary form. Binary 11010110 is equivalent to decimal 214.

Bit (byte)—One simple piece of yes-or-no information. Computer logic is built on this foundation, allowing only two digits—that's why computers use binary arithmetic. Eight bits make one "byte".

Bulk storage—An external device, such as a tape recorder, on which a computer's contents can be recorded to be reloaded into the computer when needed.

Bus—A power or signal line used in common by several parts of a computer.

Hex—Hexadecimal, the numbering system based on 16 and using the 16 digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F. Since 16 is a power of 2, binary numbers are easily converted into hex, so machine-language computer programs are often written in hex to save space. For example, binary 11010110 (decimal 214) could be written in hex as D6.

Interface—A circuit which controls the flow and format of data between a computer and a terminal or other peripheral.

I/O—Input/Output: a device which supplies data and instructions to the computer and receives the computer's output, or a circuit which interfaces with such a device.

Language—A format for computer programs. Ultimately, computers receive their instructions in "machine language," binary codes whose meanings are specific to each computer. For instance, "10000111" (C3 in hex) tells the Altair 8800 to add a number in memory to the current total. Machine codes are usually written in hex or octal for easier use by humans. "High-level languages," such as BASIC, let you write programs in fairly human terms (such as PRINT "NOW IS THE TIME"), then translate each instruction into sequences of machine codes.

Memory—an electronic device which stores information (data or program instructions) in specified locations, where the computer can retrieve it as needed (see RAM, ROM).

Monitor—a program which controls a computer's basic operations, telling it how and where to acquire the programs and data, where to store them, and how to run them.

Octal—a numbering system based on 8 and using the digits 0 through 7. Since 8 is a power of two, binary programs are easily converted into octal. Binary 11010110 (decimal 214) could be written in octal as 326.

Parallel—a type of interface in which all bits of data in a given byte are transferred simultaneously, using a separate data line for each bit.

Peripheral—Any external device used in a computer system.

Port—The physical circuit which interfaces the computer to a peripheral and the numerical address the computer uses in communicating through it.

Program—A set of instructions which tells a computer, in excruciating detail, just what to do and how and when to do it.

RAM—Random-Access Memory, the main memory of a computer. Instructions can be written into and read out of RAM, and its contents can be changed at any time. But its contents are wiped clean when power is shut off (see ROM).

ROM—Read-Only Memory. A type of memory which is not wiped clean when power is shut off. Some ROMs can only be programmed at the factory. Others, called PROMs (Programmable ROMs) can be programmed, but not erased, by the user. EPROMs (Erasable PROMs) can be erased and reprogrammed. ROMs are mostly used to store programs such as monitors which will be needed whenever the computer is used. Programs stored in ROM are called "firmware."

Software—Programs.

Terminal—A device used for communicating with a computer, usually including a typewriter-like keyboard and either a TV screen (CRT) or typing device (teletypewriter) on which your input and the computer's output can be displayed.

Материал, защищенный авторским правом

the flicking of each switch on or off.

The E&L Mini-Micro is designed as a computer trainer. It comes with a series of superb manuals, called "Bugbooks" (also available separately), which clearly teach the basics of programming and building interface circuits. And the MMD-1 includes sockets in which you can build experimental interface circuits, then change or dismantle them.

The two Altairs, with their neat cabinets and rows of LEDs and switches, look a lot more like "real" computers. But though they look alike outside, they're not much alike.

The Altair 680b (see accompanying report) is the less expensive, yet the more complete of the two: Its base price of $466 includes an interface circuit for a terminal, a small amount of working memory (1024 eight-bit "bytes") and a ROM monitor, all of which are extra in the 8800b. You can add more memory, but so far very little else.

The beautiful bus

The Altar 8800b costs $840, without memory, monitor or interface. But it's more versatile because of its 100-pin connector bus. A hundred lines run between each of the 18 cards slots in the computer to carry power, data and control signals between circuit cards.

At least three companies—IMSAI, Processor Technology and Polymorphic—have adopted the same bus for their computers, and I've long since lost count of the firms making boards to fit it. That makes accessories for the Altair about as easy to find as they are for Volkswagens.

The 8800b's biggest lack is a ROM monitor. So my first addition was a Cromemco Bytesaver ($195) that not only reads ROMs, but lets you program them yourself.

Next came a Processor Technology 3P+S interface board ($135), with a serial interface for connection to my terminal, and a parallel port for my paper tape reader.

The terminal is a Lear-Siegler ADM-3A ($875), the only terminal kit that will handle lower-case as well as capital letters (though the lower-case option adds $100 to the price). The $135 numerical keyboard shown will simplify bookkeeping.

The paper tape reader is the unique Oliver OP-80A. It's just $75, because instead of moving tapes by motor power, it uses the cheaper power of my arm.

Once I've loaded a program from paper tape (and many programs are available that way), I can copy it onto a cassette in seconds, with a Tarbell cassettee interface board ($120) that slots into the bus. The Ro-Che tape controller ($125) lets the Tarbell feed, listen to, start and stop four tape recorders. That will be a big help when I get into complex sorting programs such as bookkeeping.

(The Southwest Technical Products AC-30 cassette interface at $80 runs and interfaces two tape recorders, but its instructions only tell you how to use it with SWTP's own computer and terminal kits.)

My Seals 8K memory board ($295) adds 8192 bytes of memory to the 16,384 that MITS supplied with the Altair, for a total of 24,576 bytes.

A Processor Technology VDM-1 Video Display Module board ($199) displays computer output on a video monitor screen or a modified TV set. It can show white letters on black, black on white, or some of each for emphasis; or it can emphasize words or characters by blinking or underlining. It can play video games, too.

The last addition was a Bob Mullen extender board ($35), which raises other circuit boards so you can get at them easily for testing. Most extender boards just have a 100-pin bus plug at the bottom and a 100-pin jack at the top; the Mullen also has a "logic probe" and other test facilities.

Obviously, a full-dress computer system can cost a lot, but a simple one doesn't have to. The SC/MP, its terminal, and the Heath power supply, for instance, would cost only $275.

Whatever you get, though, you'll need help at some point in getting it to run correctly, especially if you assemble a system from several different sources. But that help is at hand: from the kit manufacturers, from more experienced hobbyists in the computer clubs popping up around the country, and from the growing number of home-computer stores. ★★★

I BUILT MY HOME COMPUTER

(Continued from page 100)

on the 680 boards often are very thin and very close together. Any solder that accidentally flows across one line to another, forming an electrical bridge for current to flow where none was intended, can blow up your microprocessor. Use plenty of bright light and look very closely to see that no bridges form.

Special handling for chips

Some of the IC chips are MOS types which require special handling to prevent static in your body, or elsewhere, from arcing across the chip and smashing its guts. You'll

(Please turn to page 164)

THE NO-SPRAY WAY TO CONTROL ODOR ALL DAY

Switch from your spray deodorant to long lasting OLD SPICE® Stick Deodoran

It's so effective, it protects up to 24 hours.

What's more, it's guaranteed not to stain or your money back. (see package for details)

And to top it all, it's got that great OLD SPICE fragrance.

So make the switch! And protect yourself like a man. Also available in Lime, Musk and Herbal.

Old Spice®

PROTECTION YOU DON'T HAVE TO CHECK.

SHULTON

Материал, защищенный авторским правом

Learn CUSTOMIZING at HOME in Your SPARE TIME!

We Teach You Everything You Need to Know to

CUSTOMIZE VANS, CARS, BUGGIES, CYCLES –INSIDE & OUT for Yourself or Others!

FLAMES
FADING
FOGGING
SCALLOPS
LACE
COBWEBS
MURALS
PIN-STRIPING
PORT HOLES
FUNKY LETTERING
MOON ROOFS
SCOOPS
SIDE-PIPES
SPOILERS
CARPETING
UPHOLSTERY
PANELLING
HIGH-BACKS
BUILT-INS
DRAPES
FLARES
ETC.

How To CASH IN NOW Customizing Van, Truck, Auto Exteriors and Interiors!

Send for FREE BOOK!

For the first time! A Home-Study Plan that puts it all together!

No special talent needed, because we teach you the professional secrets, short-cuts and easy ways to handle air-brushing, decals, screen-prints, striping, murals, upholstering, carpeting, metal-work, woodwork, etc.

NOT A "BOOK"! This is a "do-it-yourself," *home study plan* that teaches you step-by-step. You are guided all the way by our experienced counsellors.

TOOLS & SUPPLIES INCLUDED! Not theory — but real learning through practice! You get tools and supplies like air-brush, decals, brushes, and upholstery tools. Nothing else to buy! Yours to use in your course — and keep!

BE THE FIRST TO GET STARTED . . . WRITE TODAY!
Get Free Color Brochure filled with facts how to start your Customizing Career. No cost, no obligation, no salesman will call.

Careers Through Home Study
CUSTOMIZING CENTER Dept. PBO17
4401 Birch St., Newport Beach, CA 92663
Rush me free information that tells how I can learn customizing for only a few dollars a month.

Name_____ Age____
Address_____
City_____
State_____ Zip_____

Start your own car RECONDITIONING BUSINESS

EARN $14.00 or more an Hour
Part Time or Full Time

Dealers offer $50 to $200 more for a reconditioned trade-in . . . a job you can do without any costly equipment. Our new illustrated manual tells you how to start a profitable lifetime home vehicle reconditioning business in your spare time. Complete step-by-step instructions on all reconditioning procedures, plus full details on where the prospects are. Pricing, suppliers, and accounting . . . everything you need to know.

Send $9.95 plus 50c postage for your Vehicle Reconditioning Manual

NO EXPERIENCE NEEDED
START MAKING MONEY AT ONCE

The Charles Publishing Co.
Dept. PM • P.O. Box 23996
Tigard, Oregon 97223

START A PROFITABLE TOOL RENTAL BUSINESS AT HOME

Operate sparetime from your garage or basement. Start by renting your own tools & equipment. Manual tells how to acquire additional inventory for a song, what to charge, how to get customers. No franchise. Send $3.75 for easy reading report on how others are doing it. Lincoln Co., Dept. PM-12, 153 Park Ave., Passaic, N.J. 07055

FIND BURIED TREASURE

Powerful electronic detector finds buried gold, silver coins, etc. Write or call for free catalog.

Financing Available
Phone day - night (713) 682-2728
RELCO, Dept. DD62
BOX 10839, HOUSTON, TEX. 77018

DRILL YOUR OWN WATERWELL

With this low-priced outfit you can drill your own water well at a cost of about 12¢ per foot! Also, this unit can be operated horizontally to drill free-flowing springs in hillsides. A big, fact-filled package and 24-page book "How To Drill Your Own Water Well" is just $1.00 PPD. (Refundable) "WRITE TODAY"

DEEPROCK MFG. CO.
703 Lafayette Pkwy., Dept. PM27, Opelika, Ala. 36801

ELECTRIFY YOUR BIKE!

PEDALPOWER exciting new bike drive tames tough hills. Be independent. Shop when you want. Fits all Bikes, Adult Trikes. Installs in minutes. Thousands sold. Recharges overnite. Travels 100 miles for a dime. Send for FREE illustrated booklet.

GENERAL ENGINES CO.,
5124 Mantua Blvd., Sewell, N.J. 08080

An Atlas Body -in 7 Days

my method of DYNAMIC-TENSION starts giving you results that you **feel** and your friends will **notice**. Big, useful muscles. Gain pounds in weight where needed. Lose "pot belly." Send me your name and address for my 32-page book—FREE.

CHARLES ATLAS
49 West 23rd St.,
New York, N.Y. 10010
Dept. 8B

THE ORIGINAL BASEMENT TOILET

Genuine Porcelain

FLUSHES UP TO SEWER OR SEPTIC TANK

-No Digging Up Floors-
INSTALLS EASY. ANYWHERE!

Write McPHERSON, Inc., Dept. PM
Box 15133 Tampa, Florida 33684

HOME COMPUTER KITS

(Continued from page 163)

never know you have zapped the delicate innards of a MOS chip until after you have wired it in. So take pains before you button up the box to handle the MOS patiently and carefully. MITS provides detailed instructions in how to avoid zapping MOS chips.

Another easy foul-up is in placing jumper wires on the boards. These jumpers are placed according to the types of I/O device you plan to use with the 680. My 680 didn't work completely when I first fired it up after construction. I traced the trouble to a misplaced jumper which told the computer to look for an external terminal to talk on. I had none hooked up so the machine was confused. I changed the jumper to instruct the computer to give answers to me via lights on its front panel. Be careful to wire all internal jumpers correctly.

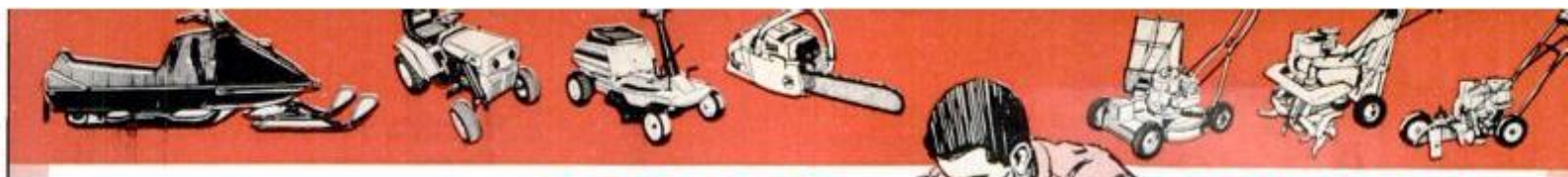
The Altair 680 is only 11 inches wides, 11 inches deep and 5 inches high. The main circuit board lies flat in the bottom of the cabinet. There is room above the main board for three additional memory boards to expand the quantity of information your computer can hold.

The second board in the barebones 680 kit is mounted vertically behind the front panel. This is the display board that holds 12 of those 56 integrated circuit chips, 27 toggle switches and 27 LEDs (light-emitting diodes which look like tiny red lights). The display board plugs directly into the main PC board via a 100-pin connector on the front edge of the horizontal board.

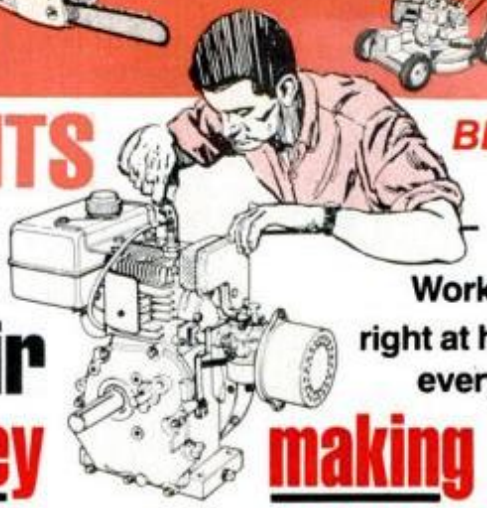
Want to watch over all temperatures inside your house in the winter and shut off your furnace when excessive fuel is being used? Want to take a fantasy ride to the Moon in a Lunar Lander game? Want Junior to have a tireless partner for math homework practice? A microcomputer system is the answer.

These "black boxes" can play endless games and help you tune up your car even as they keep track of family nutrition records and financial budgets. And an ideal way to get started in hobby computers is with the 680. It, some extra memory capacity and a companion terminal will permit you to process words and numbers and do chores your neighbor hasn't even dreamed of. You could buy the 680 already wired and tested for $625, by the way, but why not get right down to the nitty-gritty? Build your own for $466 and get going with America's next great home appliance. ★★★

Материал, защищенный авторским правом



Get in on the PROFITS in SMALL ENGINE service and repair



BEAT INFLATION!
Cash in on the huge demand for small engine repair.

Work part time, full time right at home - we help you every step of the way.

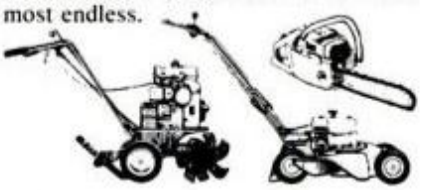
Start your own money making business!

In just a short time, you can be ready to join one of the fastest growing industries in America...an industry where qualified men are making from $10.00 to $15.00 per hour...and that's just for labor. Parts, engines and accessories add even more to the profits.

Because the small engine industry has grown so quickly, an acute shortage of qualified Small Engine Professionals exists throughout the country. In fact, it's not unusual for a good small engine man to be three to four weeks behind in the summer and at least a week behind in the winter. When you see how many small engines are in use today, it's easy to understand why qualified men command such high prices—as much as $17.50 for a simple tune-up that takes less than an hour!

46-million small engines are in service today!

That's right—there are over forty-six million 2-cycle and 4-cycle small engines in service across the U.S.A. That's the official count from the Engine Service Assn., and new engines are being built at a rate of one-million per month! With fully accredited and approved Belsaw training, you can soon have the skill and knowledge to make top money servicing these engines. Homeowners and businessmen will seek you out and pay you well to service and repair their lawnmowers, tillers, edgers, power rakes, garden tractors, chain saws, mini-bikes, go-carts, snowmobiles, generators, snowblowers, paint sprayers...the list is almost endless.



No experience necessary.

You don't have to be a 'born mechanic' or need prior experience. If you can read, you can master this profitable trade right at home, in your sparetime, without missing a single paycheck. Lessons are fully illustrated—so clear you can't go wrong.

You receive trade secrets and business plans

We guide you every step of the way, including tested and proven instructions on how to get business, what to charge, how to get free advertising, where to get supplies wholesale...all the "tricks of the trade"...all the inside facts you need to assure success right from the start.

Increased Income

"I've had about 8 years experience repairing small engines... but repairs were only minor...until I started the Belsaw Course."

Walter H. Strick
Campbell, California

With our famous 'learn-by-doing' training method, you get practical 'hands-on' experience with specialized tools and equipment that you'll receive with your training *plus* a brand-new 3 HP engine—*all yours to keep!*

SEND FOR FREE FACTS!

You risk nothing by accepting this offer to find out how Belsaw training can give you the skills you need to increase your income in a high-profit, recession-proof business of your own.

Just fill in and mail coupon below (or send postcard) to receive full information and details by return mail. ***DO IT TODAY!***

Send TODAY for this fact-filled FREE BOOKLET!

Tells how you quickly train to be your own boss in a profitable Sparetime or Fulltime business of your own **PLUS** complete details on our **10-Day NO RISK Trial Offer!**

BELSAW INSTITUTE OF SMALL ENGINE REPAIR
517F Field Bldg., Kansas City, MO. 64111

There is NO OBLIGATION and NO SALESMAN Will Call—ever!

BELSAW INSTITUTE, 517F FIELD BUILDING
KANSAS CITY, MISSOURI 64111

☐ **YES,** please send me the FREE booklet that gives full details about starting my own business in Small Engine Repair. I understand there is no obligation and that no salesman will call.

Name _____

Address _____

City _____

State _____ Zip _____

Accredited Member National Home Study Council

Материал, защищенный авторским правом

Inventions Ideas Wanted

Developed, Marketed for Cash/Royalty. Sales or Licensing to Industry.

"NO IDEA IS TOO SMALL"

LAWRENCE PESKA ASSOCIATES
500 Fifth Ave., Dept. P05
New York, N.Y. 10036

CALL TODAY
(212) 391-6350

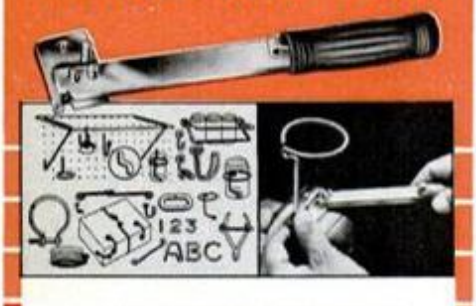
Offices throughout the U S A & Canada

Send for FREE booklet:
"How to Safeguard, Develop and Market Your Ideas to Industry."

(Please print)
Name _____
Address _____
City _____
State _____ Zip _____
Phone No. _____

New Tool Works Wonders With Wire!

WIREFORMER



IT BENDS! IT CUTS! IT STRAIGHTENS!

WIREFORMER is a simple, precision made, vise-held tool of innumerable uses. Make your own peg board hooks, clamps, handles, braces, brackets, etc.—any shape you want. Forms an eye of 3-16" inside diameter (just right for any nail, screw, or bolt up to that size). Even uses coat hanger wire. No pliers needed. WIREFORMER works with the pressure of one finger. Straightens wire if you make a mistake. Cuts wire where you want it. Forms any angle, arc or circle. Bends right and left. Tool is case hardened, plated with plastic handle. Fits in pocket. Complete instructions, illustrated brochure showing many things to make.

SOLD ONLY BY MAIL. MONEY BACK GUARANTEE. Seven dollar bills will get you one, or send check or money order for just **$6.98**

We pay postage and handling charges.

VINKEMULDER TOOL CO., Dept. PM-277
1058 San Juan S.E. Grand Rapids, Mich. 49506

speakers in a large room, or multiple sets of speakers in different rooms around your house, you can use the money you saved on the preamp to buy a monster power amplifier. And if your needs change, you can replace just one component, rather than the entire amplifying system.

First pick your power

The first steps in picking an amplifier are usually to decide how much power you need, decide what control facilities you want, see what's available in your price range, then figure how many watts and controls you're willing to do without to come within your budget. With kits, of course, you won't have to trim your list quite so much because of the money you'll save by doing your own building.

For most people, power will be the only specification really worth considering. The other specs are pretty comparable among today's kit amps. And though there are *slight* differences in sound between them (Dynaco's Stereo 150, for example, had noticeably tighter bass and slightly sharper treble than its older Stereo 120), you'd have to listen to several amplifiers a long time to really hear the difference.

Since some audiophiles feel there is a noticeable difference between the sound of tube and transistor amplifiers, Dynaco offers several power amplifiers that use tubes—their latest, in fact, is a tube model. Whether or not you hear that difference, you might appreciate the tube amplifiers' greater tolerance for such electrical abuse as shorted speaker leads. This makes tube amplifiers popular among public-address-system engineers and among audiophiles with children.

Controls: where to find them

Power amplifiers need no controls at all, but most have on-off switches, quite a few have power-level meters (handy for checking channel balance and operation, but mainly to assuage your curiosity), and many have level controls for easier accommodation of a wide range of preamplifiers, or easy inter-channel balancing.

More and more amplifiers now offer plug-in speaker connections. That's handy, especially with the heavier amps, because you can wire the connector before you slide the amplifier into position, while connections are still easy to see and get at. The Heath 400-watt amp uses special plugs that can only be inserted one way, to make sure your

(Please turn to page 168)

Heath's 'Module I'; it's more than just a preamp

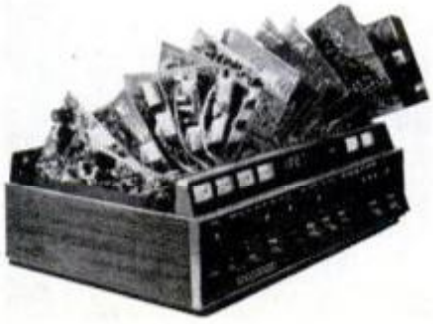
Heath's new AN-2016 "Modulus" is an unusual combination: A preamp with an AM-FM stereo tuner built in. That gives you the convenience of having all your controls in one place while keeping your power amplifier tucked out of the way. It also, as with any preamp, lets you choose how much amplifier power you want.

The AN-2016, "Module I" in the new Heath series, is by far the most complex—and versatile—piece of gear we tested. After about 50 hours of construction time and $599.95, you'll have a preamp that can handle stereo records and four-channel tapes superbly and a digital readout tuner. The tuner's FM section performs as well as almost any FM tuner on the market, and its AM section is almost as good as most hi-fi FM tuners and a great deal better than any of the run-of-the-mill AM tuner sections now on the market.

Control features include output level meters for all four channels, signal-strength and channel center tuning meters, front-panel tape-dubbing jacks, and pushbuttons that light to show which are activated. And there's a relay that cuts the preamp's output when you turn the power on and off—this keeps amplified switch clicks from blowing out your speakers.

As the name implies, the AN-2016 has modular construction. You can build and install additional modules whenever you need them. Module IV ($39.95) is a noise-reduction circuit for Dolby-encoded FM broadcasts. Module V ($79.95) is a demodulator for CD-4 discrete four-channel records, and Module VI ($49.95) is a decoder for SQ four-channel discs. Total building time for the AN-2016 and these three modules is about 50 hours.

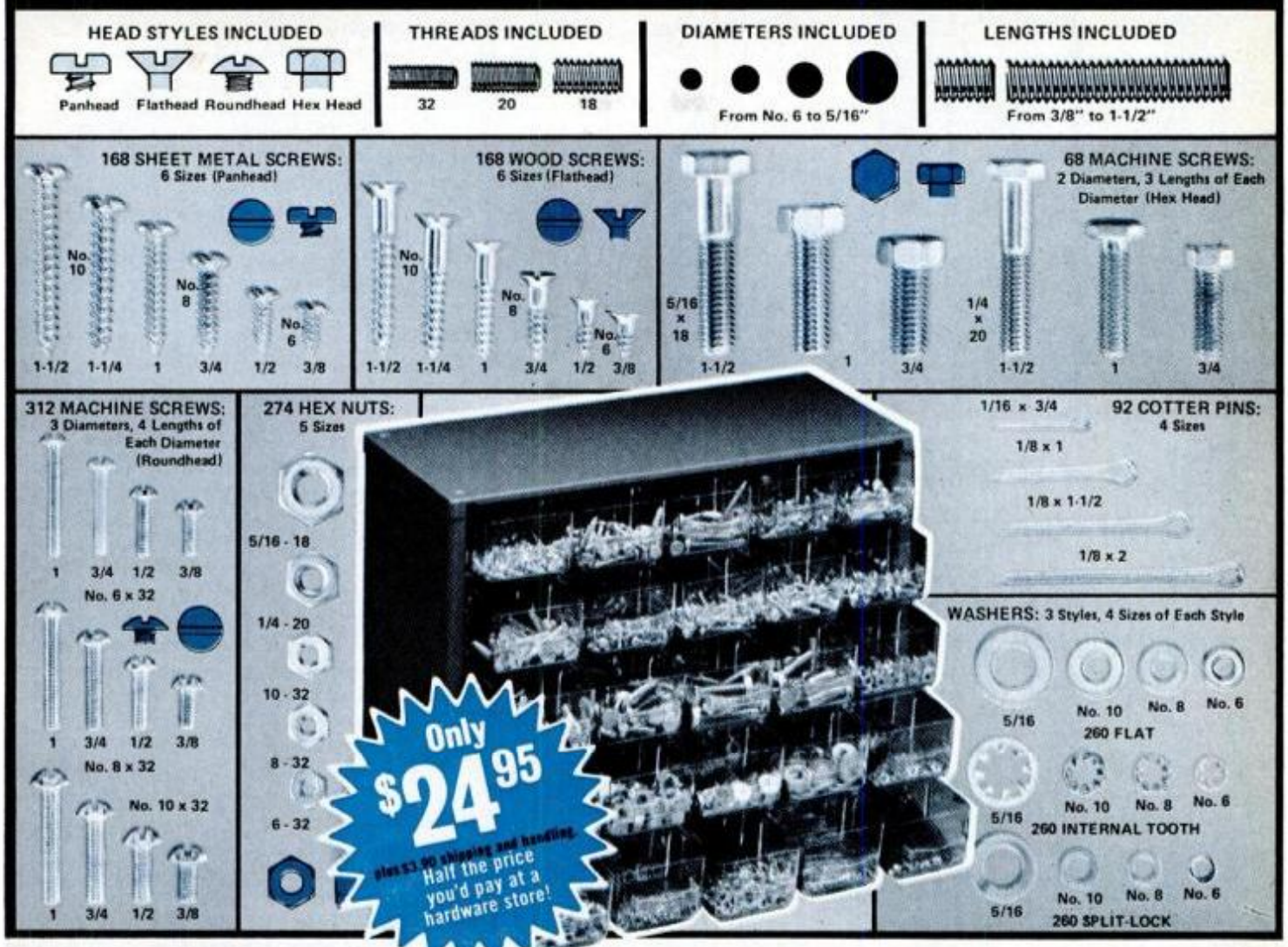
Modules II and III don't fit inside the AN-2016: They're independent stereo amplifiers of 35 and 60 watts, respectively, per channel, whose front panels match that of the Module I.



Материал, защищенный авторским правом

LOOK AT ALL YOU GET!

1,862 nuts, bolts, screws, and other fasteners • Heavy-duty, all-steel cabinet, 12"W. x 5½"D. x 9"H. • 25 pre-printed I.D. labels • 51 individual compartments • 25 high-impact plastic bins, 2"W. x 5½"D. x 1½"H.



Just about every nut, bolt, screw, washer, and cotter pin you'll ever need – nearly 2,000 pieces – all in one, organized steel cabinet.

- **Now . . . your own hardware store for home, shop, or office!**
- **1,862 fasteners total — all high-quality, zinc plated (rustproof) steel.**
- **No more piece-at-a-time trips to the hardware store.**
- **Heavy-duty, all-steel cabinet, high-impact plastic bins and bin dividers, printed I.D. labels.**
- **Truly a $50 value.**
- **Unconditional 30-day money back guarantee.**
- **The most important tool in your workshop.**
- **The hit of the Minneapolis Builder's Show. As featured by the editors of:** MECHANIX ILLUSTRATED, POPULAR SCIENCE, WORKBENCH, FAMILY HANDYMAN, HOT ROD AND OTHERS.

Now you can have just the right nut, bolt, screw, washer, or cotter pin at your fingertips . . . whatever the job! And for an almost unbelievable low price!!

With the NUT & BOLT SHOP — a complete size range of just about every kind of hardware you'll ever need. All organized in one all-steel, 25-tray, 51-bin cabinet. Perfect for auto repair. Home projects and hobbies. Office maintenance. And industrial shop use. Great as a gift, too!

No more time-consuming trips to the hardware store. No more less-than-professional looking repair jobs. No more searching through old coffee cans of fasteners.

Order today! Send check, money order, or company purchase order for just $24.95 (plus $3.90 shipping and handling). If you're not completely satisfied — if you're not truly amazed at all you get — return it within 30 days for a full refund. No questions asked! And keep the FREE $2.50-value wall chart for your trouble!

FREE

17½" x 24" wall-size Specifications Chart — a $2.50 value. Tells you everything you need to know for a quick professional job every time. What thread types and head styles are available. What size nut and wrench to use. What size "starting" and "tapping" holes to drill. When to use what kind of washer. Instantly measures sizes. And much, much more. Yours FREE just for trying the Nut & Bolt Shop!

OUR CUSTOMERS ARE AMAZED AT THE VALUE!

"I don't see how you make a profit at such a low cost! I found it much more than I expected!!"
M.D. Dorsette, Rockville, Maryland

"An excellent buy. At retail prices, would have cost far more . . . usually a minimum of 3¢ to 5¢ a piece!"
G.L. Steiger, Enfield, Connecticut

"Quality is excellent. Great for do-it-yourselfers . . . and convenient!"
G.R. Dalmadge, Sunnyvale, California

"I've priced these items separate — it would have cost far more for them (at a hardware store)."
J.D. Russell, Cicero, Illinois

30 DAY UNCONDITIONAL MONEY BACK GUARANTEE

DRI INDUSTRIES, Dept. 4N
8200 Humboldt Avenue So., Minneapolis, MN 55431

☐ I have enclosed my check, money order, or company purchase order for _____ Nut & Bolt Shop(s). (Minnesota residents add 4% sales tax.)

PLEASE PRINT

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Материал, защищенный авторским правом

Patch or panel your walls fast and easy.

DAP Interior Spackling Compound fills fine line cracks and deep holes in plaster and drywall. Comes ready-mixed so it's a snap to apply. Dries fast, sands to a feather edge and takes paint perfectly.

DAP Panel and Dry Wall Adhesive saves you time and work in paneling a room. Fastens paneling and wallboard to studding and furring faster, reduces need for nailing. Simplifies panel alignment.

Home fix-up's a snap with DAP

DAP is a trademark of DAP Inc.

DAP Inc., General Offices: Dayton, Ohio 45401
Subsidiary of Plough, Inc.

AMPLIFIER KITS *(Continued from page 166)*

speakers are in phase with one another. The Dyna and Schober amps, on the other hand, use "double-banana" jacks whose plugs can be inserted either way, so if you've wired a plug incorrectly, you can just reverse it in its socket to correct the phasing. These jacks are combined with binding posts that also take bare wires or spade lugs. And the Ace amplifier has spring-loaded terminals that lock onto bare wire ends.

The Dynakit 400 has an additional switch, for its "Dynaguard" circuit that lets brief, high-power signals through but limits long, speaker-damaging ones. This control and circuit are omitted, though, from Dyna's stripped Model 410.

Preamps and integrated amplifiers have more elaborate controls. Make sure the one you get has enough inputs and tape monitor loops to handle all the other components you intend to hook up to it.

Dynaco's preamplifiers have exceptionally flexible inputs, including one which can be wired for a second turntable, a microphone or for a tape deck with no electronics of its own (though such decks are quite rare these days). Dyna's PAT-5 ($239) also has two tape-monitor loops and provision to control your power amplifier's output, switching it to various speakers or to a headphone jack in the PAT-5's panel.

The Ace Model ZDP "zero-distortion" preamplifier has only selector and volume controls and a power switch—to eliminate distortion, it eliminates all circuits except the phono preamp stage.

If you need higher output levels, you can wire in the amplication circuits that turn the Ace into a Model BSP; they're included in the kit, so you can wire it either way.

How kit companies compare

All it takes to build an amplifier kit is a little manual dexterity and patience. But some kits are trickier than others (power amplifiers are easiest), so take your time. And there are differences between the ways each company designs kits, as well as in the number of kits they offer.

■ **Ace Audio** (447 Elwood Rd., East Northport, N.Y. 11731) provides minimal instructions. On the preamplifier kit, for example, you're told how to install components on half the board, then just told that the other half is wired the same way. But there's so little wiring in an Ace kit that neither the preamplifier nor the 35-watt-per-channel stereo power amp ($150) should take long or be hard to build.

■ **Dynaco** (Box 88, Blackwood, N.J. 08012) offers more complete, step-by-step instructions, and builds most of the printed-circuit boards for you. That makes Dynakits about the fastest and easiest to build.

Dyna offers two transistor preamps one tube-type preamp, a 30x2-watt stereo integrated amp, and 10 power amps: monophonic tube amplifiers of 50 and 100 watts, solid-state stereo amplifiers of 20, 40, 60, 75, 150 and 200 watts per channel, and a 4-channel, 75x4-watt amp (the 150x2-watt amp can be converted into this).

■ **Heath** (Benton Harbor, Mich. 49022) goes overboard in its instruction manuals to make sure that anyone, even people with absolutely no training in electronics, can build one of their kits and have it work. There are drawings to go with each step and complete troubleshooting guides if you encounter difficulties. Heath even provides solder.

Heath currently offers a stereo preamp ($130) the "Module I" tuner/preamp combination (see page 166), stereo-integrated amps of 15, 35 and 70 watts per channel, four-channel amps of 15 and 35 watts per channel, and a 3¼-watt monophonic integrated amp. Their stereo power amplifiers offer 35, 60 and 200 watts per channel.

■ **Schober Organ Corp.** (413 West 61 St., New York, N.Y. 10023) designed its amplifiers for use with electronic organs, so they're solidly built to withstand abuse. Their manuals, too, are designed for the builders of their organ kits, who are often more interested in music than in electronics, so the kits aren't hard to build.

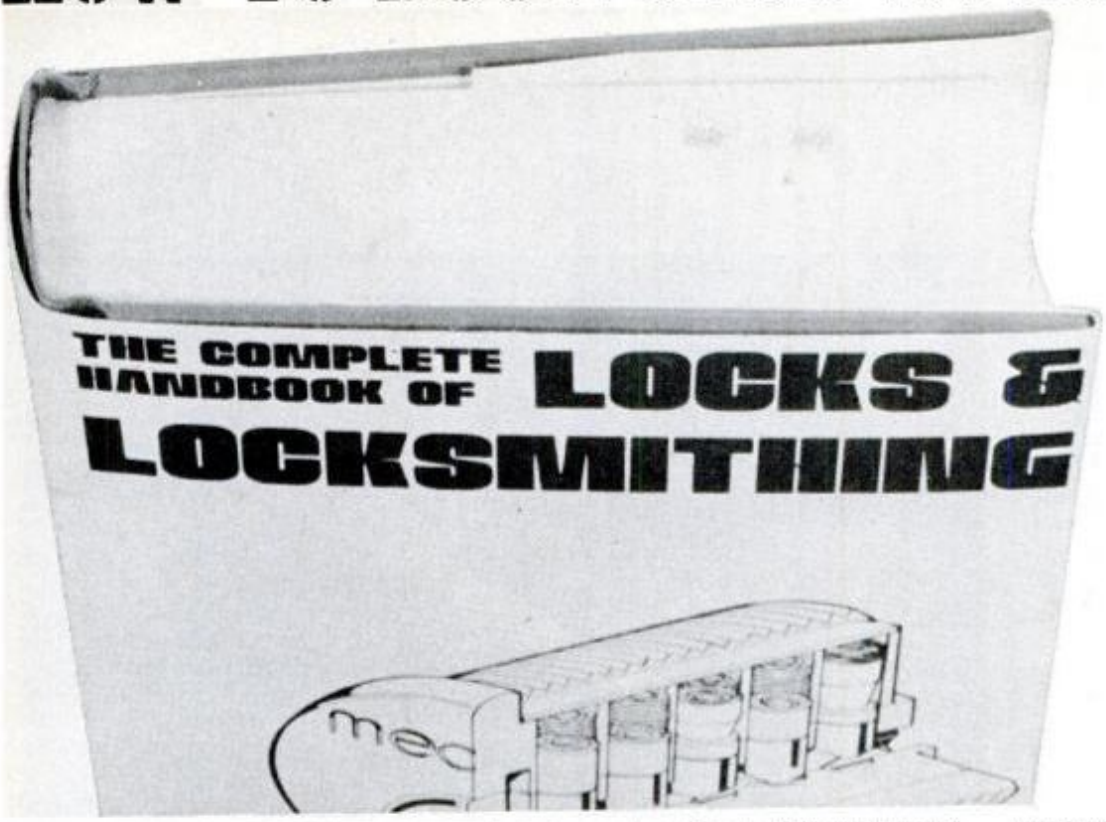
Schober makes two amplifiers: a 70-watt monophonic model ($176) and a 70-watt-per-channel stereo model ($240).

■ **Southwest Technical Products** or SWTP (219 West Rhapsody, San Antonio, Tex. 78216) designs kits and writes manuals for the experienced kit builder. If you've never built a kit, you may have to read each instruction a few times to get the point; but you can probably get the kit built if you're willing to take the time.

SWTP kits are exceptionally low-priced ($75 for a stereo preamp, $41 for a 15x20 and $70 for a 25x2-watt stereo amp, $78 for a 60-watt mono and $155 for a 250-watt mono amp), and their circuits are well-designed. But the low price shows in the hardware used. ★★★

Материал, защищенный авторским правом

HOW-TO BOOK CLUB invites you to take this 392-p. $10.95 how-to locksmithing library for only 29¢ with a Trial Membership in the Book Club that saves you 25% to 75% on a wide selection of how-to books



The Complete Handbook of Locks and Locksmithing

This brand-new and extremely comprehensive volume is a detailed lock-by-lock course in the craft of locksmithing. It's written especially for beginners, and it teaches you step by step all the skilled, practical know-how of the professional locksmith. It starts with the basics, and it covers the whole field of locksmithing, from the simplest to the most sophisticated high-security protection devices. You learn how to cut keys, how to decode lock codes, how to masterkey, how to extract broken keys, how to change lock combinations, how to repair lock mechanisms, how to convert everyday locks to more protective ones, and how to open locks...even how to start your own locksmithing business. This interesting volume covers every kind of lock in current use—from the inside out. There is practical, ready-to-use information on combination locks, lever locks, vending machine locks, disc-tumbler locks, cylinder locks, automobile locks (ignition, door, trunk, glove compartment, gas tank), warded locks, padlocks, and many, many others. Even if you've never seen the inside of a lock before, this plain-talk handbook will show you how to repair, service, and install just about any lock you'll ever come across! You'll learn how every component works—every spring, every ward, every pin, every key...plus all the proven, reliable locksmithing techniques the pros use.

At last, here's an easy-to-understand guidebook that shows the rank beginner how to handle locksmithing tools with all the skill of the trained locksmith. There are complete instructions on how to use files, key machines, lockpicks, extractors...all the tools of the trade.

To truly understand locks, you really have to "get inside" them, so there are over 200 cutaway and exploded-view drawings and photographs to help you do just that. These clear, revealing views show you exactly how specific locks work, and exactly what you have to do to service and maintain them. From simple warded locks to intricate combination locks, all the illustrations and data you need are here.

The detailed Chapters on keying show you how to make any key for any lock. Precise, step-by-step instructions tell you how to cut keys by hand, how to make key impressions, how to "read" locks, and how to decipher key codes. The author carefully explains all the professional keying techniques, and all the tricks of the trade that go along with them.

There's even a thorough treatment of one of the most important locksmithing skills of all—opening locks. Clear instructions show you how to open all kinds of locks—the easy ones and the hard ones. You learn which picks to use, where to apply pressure, what to look for, how to "feel" the tumblers. There's even a whole Chapter on emergency entry procedures that locksmiths use when picking fails.

You get practical information on home services like installing locks, replacing locking mechanisms, changing lock hands, extracting broken keys, and altering lock combinations. You learn how to troubleshoot everyday home, shop, and office lock problems. There's plenty of supplementary information, too—like a glossary that defines all the professional locksmithing terms, an Appendix that tells you how to select a good lock, and a Chapter on locksmithing and the law. There's an entire section that shows you how to set up your own lucrative locksmithing business—an exciting trade marked by its high standards of ethics and service to the community.

Whether you're an amateur locksmith who wants to go professional, or a budget-minded homeowner who wants to repair your own locks or make your home, car, office or store more secure, "The Complete Handbook of Locks and Locksmithing" has everything you need to do the job right: easy-to-read instructions; complete, professional information; and clear, definitive illustrations. 392 pps., 200 illus. Hardbound. Publisher's List Price $10.95.

Let us send you this practical new time-and-money saving book as part of an unusual offer of a Trial Membership in How-To Book Club.

Whatever your interest and needs—be it home building/remodeling, furniture building/repair, cars, electronics, appliance servicing, energy-saving, house wiring, boats, lawnmower and engine repair, hi-fi, motorcycles, gardening, technology, upholstering, concrete/masonry, aviation, plumbing, photography, hobbies, locksmithing, woodworking, etc.—you'll find How-To Book Club offers practical, quality books that you can put to immediate use and benefit...books that will help you increase your know-how, save you money, and make your leisure hours more enjoyble.

This extraordinary offer is intended to prove to you, through your own experience, that these very real advantages can be yours...that it *is* possible to keep up with the literature published in your areas of interest, and to save substantially while so doing. As part of your Trial Membership, you need purchase as few as four books during the coming 12 months. You would probably buy at least this many anyway...without the substantial savings offered through Club Membership.

To start your Membership on these attractive terms, simply fill out and mail the coupon below today. You will receive *The Complete Handbook of Locks & Locksmithing* for 10-day inspection. YOU NEED SEND NO MONEY! If you are not delighted, return it within 10 days and your Trial Membership will be cancelled without cost or obligation.

HOW-TO BOOK CLUB, P.O. Box 8, Blue Ridge Summit, Pa. 17214

TYPICAL CLUB SELECTIONS and their List/Club prices are:

Build Your Own Stone House,$8.95/$4.95—Encyclopedia of Household Plumbing,$14.95/$5.95—Homeowner's Handbook of Power Tools,$9.95/$6.95—Motorcycle Repair Handbook,$9.95/$5.95—Fine Furniture For The Amateur Cabinet Maker,$10.00/$4.95—Vega,$8.95/$4.95—Complete Homesteading Book,$8.95/$5.95—Do-It-Yourselfer's Guide To Home Planning/Construction, $7.95/$3.95—How To Repair Home Laundry Appliances,$8.95/$4.95—Step-By-Step Guide: Carburetor Tuneup/Overhaul,$7.95/$4.95—Homeowner's Guide To Solar Heating/Cooling,$7.95/$3.95—Customizing Your Van,$6.95/$3.95—How To Test Almost Everything Electronic,$6.95/$2.95—Professional Picture Framing For The Amateur,$5.95/$1.95—Concrete & Masonry,$10.95/$5.95.

Facts About Club Membership

● The introductory book carries a publisher's retail price of $10.95. It is yours for only 29¢ (plus postage and handling) with your Trial Membership ● You will receive the Club News, describing the current selection, alternates and other offerings every 4 weeks (13 × a year). ● If you want the selection, do nothing: it will be sent to you automatically. If you do not wish to receive the selection, or if you want to order one of the many alternates offered, you simply give instructions on the reply form (and in the envelope) provided, and return it to us by the date specified. This date allows you at least 10 days in which to return the form. If, because of late mail delivery of the Club News, you do not have 10 days to make a decision and so receive an unwanted selection, you may return it at Club expense. ● Personal service for your account—no computers used! ● To complete your Trial Membership, you need buy only four additional monthly selections or alternates during the next 12 months. You may cancel your Membership any time after you purchase these four books. ● All books—including the Introductory Offer—are fully returnable after 10 days if you're not completely satisfied. ● All books are offered at low Member prices plus a small postage and handling charge ● **Continuing Bonus**: If you continue after this Trial Membership, you will earn a Dividend Certificate for every book you purchase. Three Certificates, plus payment of the nominal sum of $1.99, will entitle you to a valuable Book Dividend of your choice which you may choose from a list provided Members.

HOW-TO BOOK CLUB
P.O. Box 8
Blue Ridge Summit, Pa., 17214

Please open my Trial Membership in HOW-TO BOOK CLUB and send my 392-page Locksmithing Library, invoicing me for only 29¢ plus shipping. If not delighted, I may return the book within 10 days and own nothing, and have my Trial Membership cancelled. I agree to purchase at least four additional books during the next 12 months, after which I may cancel my Membership at any time.

Name _____ Phone _____

Address _____

City _____

State _____ Zip _____

(This offer valid for new Members only. Foreign and Canada add 10%) PM-27

It's a plane, it's a glider . . . it's both!

by Sheldon M. Gallager

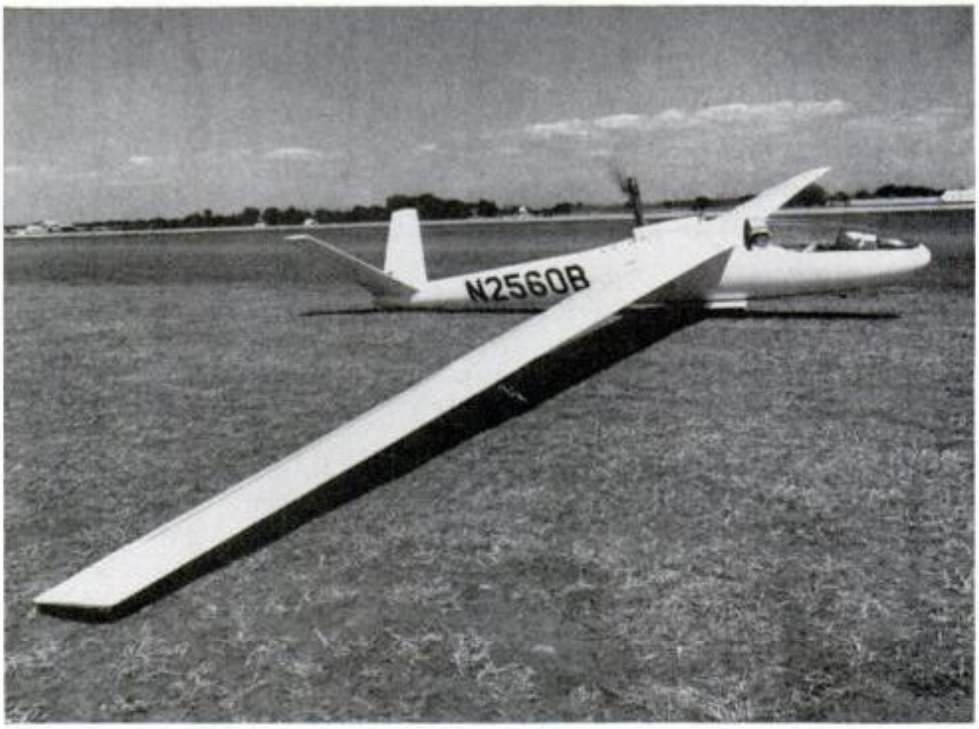
PM photos: Howard Levy

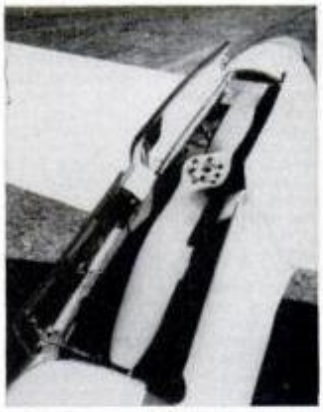
As sailboat owners have long known, it doesn't hurt to have a little auxiliary engine power to get you home if the wind quits or a storm blows up. Now many glider enthusiasts are coming to the same conclusion—a little booster on the back can be a big help. Shown here are a new breed of self-powered sailplanes—"motorgliders" as the clever hybrids are called. Even hang gliders are taking on power—a factor said to greatly reduce the hazards of air surfing. And there's good news for do-it-yourselfers: You can build some designs from plans or kits.

Why power? Because engine-equipped sailplanes can take off under their own power, you don't need a tow plane to get airborne—often costly or not readily available. You just start your engine and you're off. If you run out of thermals to ride on, you can restart the engine, climb to soaring altitude, cut power and glide freely. If you stray a bit too far from home or encounter a sudden squall, you can switch back to power and return quickly.

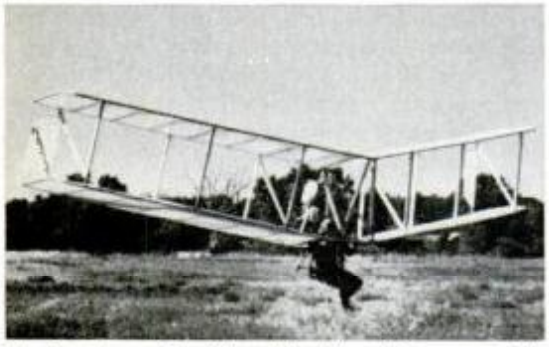
Power vs. free flight

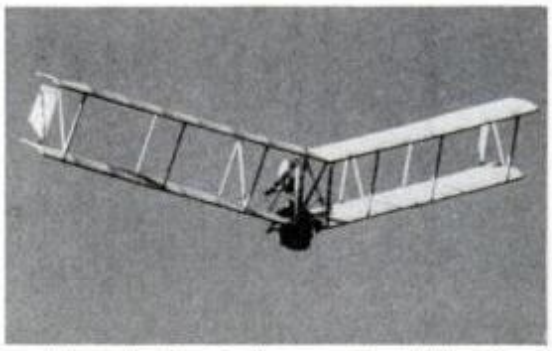
Does auxiliary power compromise the sport of free-flight soaring? Some sailplane purists may not agree, but those who have tried it say no—they like the greater freedom, range and safety that power assist affords. First, added engine weight is minimal—not enough to affect glider performance. Many use small garden-tractor or snowmobile engines weighing as little as 12 pounds (a favorite choice is the tiny 12-hp, 12-pound McCulloch 101 powerplant). Second, auxiliary pow-





This long-wing beauty started out as conventional unpowered sailplane, but designer Vern Oldershaw decided to add auxiliary power for self-launch takeoffs and long-range soaring. Ingenious retractable prop (lower photos above) folds into fuselage well for free flight to eliminate drag, can be raised or lowered during flight, is automatically self-aligning to fit in well. Engine is 30-hp Yamaha; wingspan, 55 feet; overall length, 23 feet; speed, 125 mph; climb rate, 400 fpm.

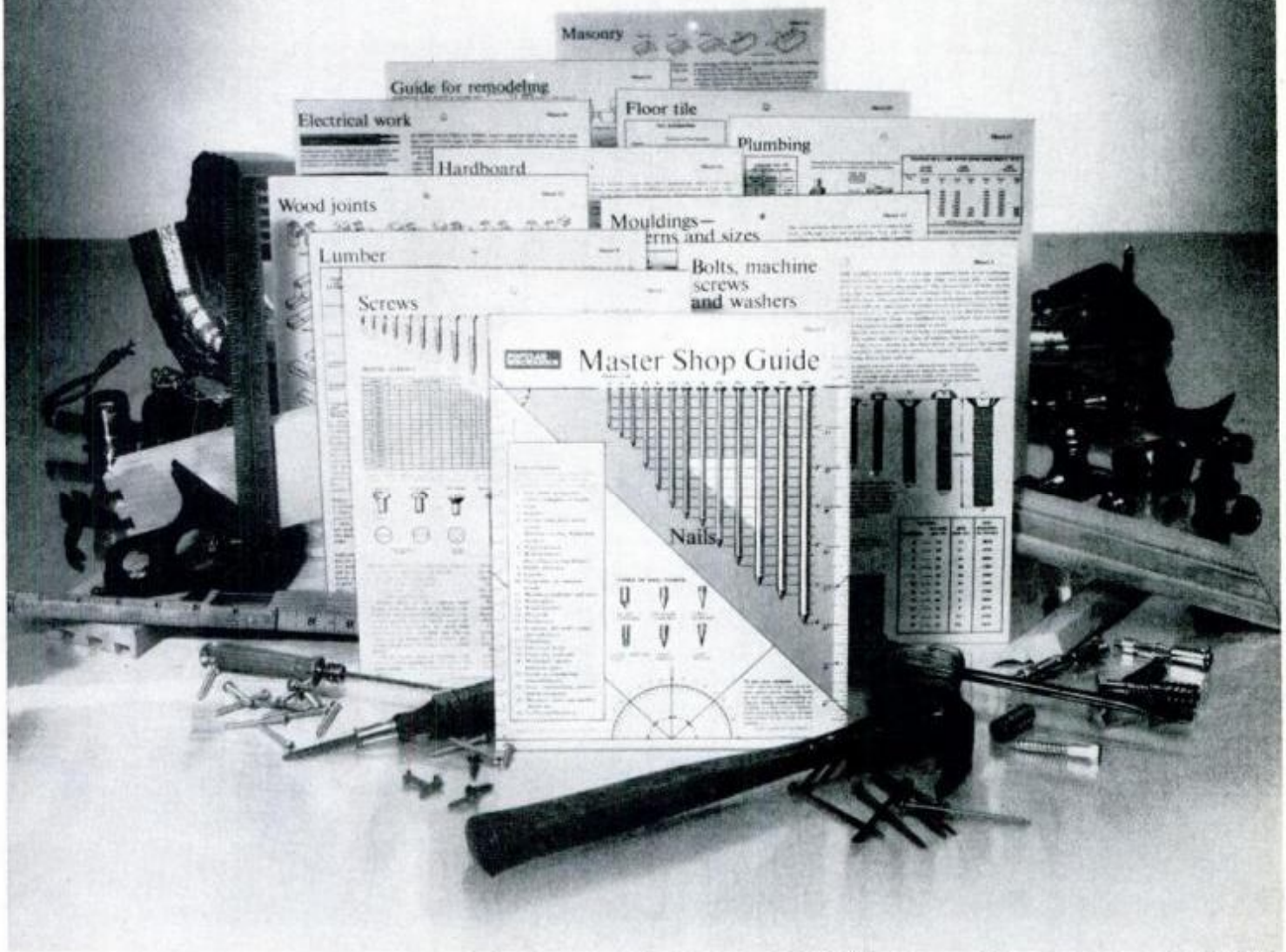




No jumping off cliffs with this self-powered hang glider. Just start the engine, take a few steps and you're airborne (center). Craft is standard Icarus II biwinger fitted with 12-hp McCulloch powerplant (right). Engine can be stopped in midair for free flight, then restarted at any time to gain altitude or get safely home. Complete kit, including engine, is about $1300.

Материал, защищенный авторским правом

One of the most important tools you'll ever buy.



Why? Because MASTER SHOP GUIDE lays out everything you need to know, graphically and ready-to-use.

What? All about nails, screws, bolts, wall fasteners, drills, abrasives, lumber, plywood, gypsum, adhesives, paneling, shop math, stair construction, masonry, wood finishing, plumbing, pipe fittings, electrical work, gutters, concrete, remodeling measurements *plus* a built-in ruler, protractor, 45° triangle and compass. *You'll use it in every job you tackle.*

How? Twelve hang-up, stand up boards. 24 surfaces of laminated-to-last wipe-clean plastic. 56 charts. *The* fundamental workshop reference tool.

Who? Chances are, your *"shop-wise"* neighbor already has one. Nearly two hundred thousand sets have already been purchased by Popular Mechanics readers and shop enthusiasts.

When? *Right away!* You can get your set in a few days by mailing this coupon along with your check or money order for $4.95 plus 50¢ shipping.

PM Master Shop Guide, Dept. PM277,
Box 1014,
New York, N.Y. 10019

Please send me _____ set(s) of Popular Mechanics MASTER SHOP GUIDE. I enclose $4.95 plus 50¢ for each set ordered.

Name _____

Address _____

City _____ State _____ Zip _____

Материал, защищенный авторским правом

er is used only for self-launch take-offs and climbing when adverse weather conditions rule out conventional soaring techniques. Speeds under power approach or exceed 100 mph, with climb rates of 300 to 500 feet per minute (fpm). Glide ratios in free flight range up to a respectable 27 to 1—as good as for many unpowered sailplanes.

Here's a rundown on what's available where and for how much:

■ **Powered Icarus II** hang glider developed by John Moody. Information package is $5; complete kit with engine, about $1300. Ultralight Flying Machines of Wisconsin, Box 21867, Milwaukee, Wis. 53221.

■ **Catto Aircraft,** also offering powered hang gliders. Box 1619, Cupertino, Calif. 95014.

■ **Marske-Monarch.** Plans are $60 from Jim Marske, 130 Crestwood Dr., Michigan City, Ind. 46360.

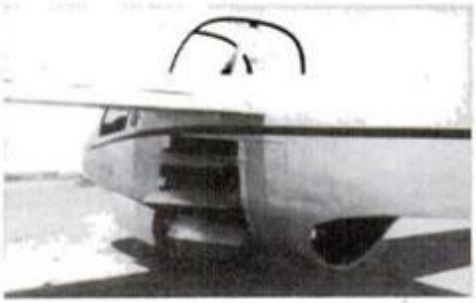
■ **American Eaglet.** Complete kit about $2000, AmEagle Corp., 841 Winslow Court, Muskegon, Mich. 49441.

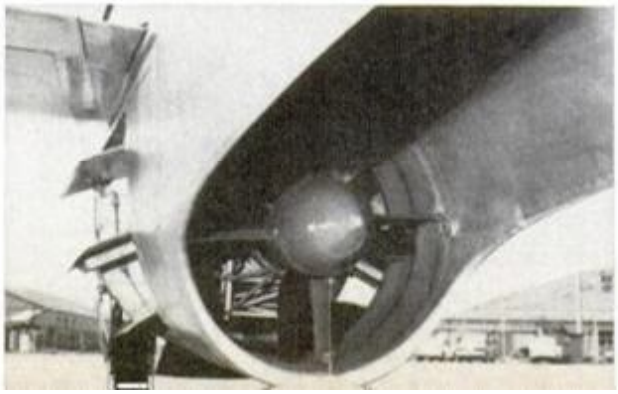
■ **Oldershaw.** Marketing plans not yet certain. Information from Vern Oldershaw, 2508 Talisman Dr., Bakersfield, Calif. 93304. ★★★

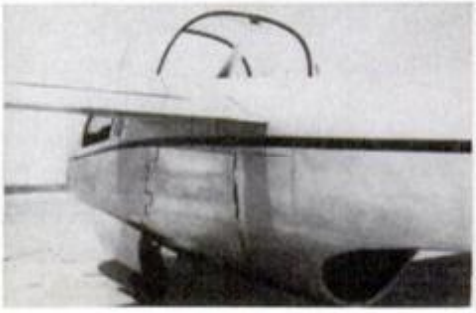
Flying wing at right has vertical fin and rudder but no horizontal tail—elevator panels are in wing along with ailerons. Pilot sits in pod slung under wing, using overhead control stick. Engine is 12-hp McCulloch mounted in rear of pod with pusher prop. Called Monarch, fiberglass craft takes off in 50 feet, climbs 500 fpm, has 70-mph top speed. Wingspan is 39 feet; length, 11½ feet. Plans are $60.

Trim little speedster at left can hit 100 mph under power, yet has a remarkably high glide ratio of 27 to 1 in free flight—as good as many commercial non-powered sailplanes. Like the Monarch above, it has a 12-hp engine mounted in rear of cockpit pod. Unique spring-loaded prop blades (shown being held open below) fold when power is cut to reduce drag. Centrifugal force opens blades under power. Called American Eaglet, craft comes as kit for $1995.

Biggest motorglider now flying is this experimental Japanese two-seater destined to go into commercial production later. Built by Japan Aircraft Mfg. Co., Ltd. of Yokohama, it has a 63-hp Kawasaki three-cylinder motorcycle engine. Prop is shrouded in circular housing under tail boom (below) to provide ducted-fan effect for maximum thrust. Air-intake slats (far right) operate like Venetian blind, opening for powered flight, closing for free flight to avoid drag. Top speed is 160 mph; stall speed with flaps, 40. Wingspan is 59 feet; length, 26; climb rate, 390 fpm; glide ratio, 30 to 1. Sale price not yet determined.







Материал, защищенный авторским правом

NEXT MONTH IN PM . . .

- *How you can rent a wreck*
- *Isaac Asimov on how the world may end*
- *Underground houses: a new way to live*
- *Special section for outdoor RV action*
- *Owners report on their electric cars*
- *12 pages on starting gardens and clipping lawns*

SUBSCRIPTION SERVICE: Popular Mechanics Magazine will, upon receipt from its reader of a complete new or renewal subscription order, undertake fulfillment of that order so as to provide the first-copy delivery to the Postal Service within six to twelve weeks. If for some reason this cannot be done, you will be promptly notified of the issue date that will begin your subscription, with a request for any further instructions you may have concerning your order. Please address all such orders to us at Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50340.

Should you have any problem with your subscription, please write to John Harris, Customer Service Department, Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50340. To assure quickest service, please enclose your mailing label when writing to us or renewing your subscription.

Renewal orders must be received at least eight weeks prior to expiration to assure continued service.

Popular Mechanics

P.O. Box 10060, Des Moines, Iowa 50340

W9PM

YES! Please enter my subscription to POPULAR MECHANICS for:

☐ 1 year $7.00 ☐ New

☐ 2 years $13.00 ☐ Renewal

Payment of $_____ is enclosed.

Bill Me_____
initial here

Name (please print)

Address

City State Zip

Your first copy will be on its way to you in six to twelve weeks. Watch for it!

Credit orders subject to publisher's acceptance.

(Above prices apply in U.S. & Possessions only. All other countries add $6.00 per year).

CHANGING ADDRESS?

If you're planning to move, please let us know at least eight weeks before changing your address. Attach current address label and fill in your name and your new address. This will serve to insure prompt service on your subscription.

Send old label with your name and new address to:
POPULAR MECHANICS
P.O. Box 10064, Des Moines, Iowa 50340

NAME_____ (Please print)

NEW ADDRESS_____

CITY STATE ZIP CODE

TRACK POWER OUTWORKS WHEEL-TYPE TRACTORS

More efficient dozer power and high maneuverability for larger gardens, snow removal, complete landscape projects. Up to 16 hp. Over 30 attachments incl. all garden tools, dozer blade, hydraulic loader. Factory direct savings. Unique, popular, EASILY ASSEMBLED KIT. Odd job and resale opportunities are great. Send now, to:

STRUCK KIT, Dept. PM27, Cedarburg, Wis. 53012

☐ Catalog showing Crawler Tractor Kit construction & uses (specify Magnatrac or Mini-Dozer) — 50¢. Both Catalogs — 75¢.

☐ Plans for fabricating a Crawler Tractor Kit from local materials (specify Magnatrac or Mini-Dozer) — $6.00. Both Plans — $9.00 (refunded on any purchase).

NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

GARAGE DOOR **OPENER** Buy Direct and Save

• RADIO CONTROLLED from car transmitter or wall switch • SAFETY night and day year 'round • SECURITY door locks tight when closed • CONVENIENCE in car control any weather • LIGHTING garage lights automatically • VERSATILE fits all lifting type wood, metal or fiberglass doors sectional and 1-piece • EASY HOME INSTALLATION in just 2-3 hours • SAVE up to 50% direct factory purchase and PP or UPS home delivery • GUARANTEED one year • FREE brochure
HELPMATE Equipment Co., Box PM-2 Baroda, MI 49101

Print Your Own

Cards, Stationery, Advertising, labels, tickets, announcements, QSL cards, greeting, sympathy, prayer cards, etc. Save money. **Print for others, good profit.** Have home print shop. Pays for itself in a short time. Sold direct from factory. Easy rules sent. We supply everything. Send 25¢ for catalog. **KELSEY PRESSES Meriden, Conn. 06450**

MAIL THIS COUPON TODAY **Kelsey Presses Dept. 77-BN Meriden, Conn. 06450**

I enclose 25¢ send big catalog and free samples.

Name_____

Address_____

City_____ State_____ Zip_____

HEADQUARTERS FOR EVERY TYPE & SIZE AT REAL DOWN-TO-EARTH MONEY SAVING PRICES!

ALL FAMOUS BRANDS! **TIRES!** AUTO TRUCK SPORT CAR FARM TRAILER

TREMENDOUS SAVINGS! LET US PROVE IT TO YOU ... WRITE US TODAY ...

Send for your FREE catalog!

RELIABLE TIRE CO. 1111 Chestnut St. Camden, N.J. 08103

AMAZING & HARD-TO-FIND SCIENCE BUYS!
ALTERNATE ENERGY • SPACE AGE • HOBBIES

NEW WIDE FIELD TELESCOPE

Enjoy clearest, brightest, most spectacular wide angle views of stars, moon, comets with our unique, easy-to-use portable 4¼", f/4 Newtonian reflector. Only 17", 10 lb.! Take it anywhere.
No. 2001H ...$149.95 Ppd.
There is no other telescope like it.

SAVE 50%! 8 x 20 MONOCULAR

Top quality Spy Scope, a $30 value, now $14.95! Special purchase saves you 50%. 100% coated optics; 393 ft. field of view. Only 2 oz.—stores in pocket, purse, glove box.
No. 1568H .....$14.95 Ppd.

NASA-CHOSEN FOR APOLLO/SOYUZ

The Astronauts used this super 20X60 binocular (modified) to view Earth! Big 60 mm objective lenses; 173-ft. field of view at 1000 yds. Relative brightness, 9.0. Fully coated optics, more!
(9¼x8½"; 47.5 oz)
No. 1556H .....$99.95 Ppd.

GIANT MAGNET, LITTLE PRICE!

Tie a line to our over-150 lb.-lift ceramic magnet and haul up treasure from the sea. 4 ceramic magnets, in series, between steel plates. A 1-lb. "giant"!
(1 x 1¼ x 4¾")
No. 42,318H .....$11.95 Ppd.

BUILD A WORKING STEAM ENGINE

Exact 6x8¼" hi replica of Single Acting Engine can power erector set assemblies, runs on tap water; you control speed, make whistle blow. Adult supervision. 35 parts.
No. 72,202H ..$27.50 Ppd.

SUPER POWER FOR ANY AM RADIO

Antenna assist has pulled in stations 1000 miles off! No. wires, clips, grounding. Solid state—no elec., batts., tubes.
No. 72,095H $19.95 Ppd.
ULTRA SELECT-A-TENNA
No. 72,147H.....$24.95

GIANT FREE 164 PG. CATALOG

4500 UNUSUAL BARGAINS FOR HOBBYISTS, SCHOOLS, INDUSTRY

EDMUND SCIENTIFIC CO.
300 Edscorp Bldg.
Barrington N.J. 08007
America's Greatest Science • Optics • Hobby Mart

COMPLETE AND MAIL COUPON NOW

EDMUND SCIENTIFIC CO. 300 Edscorp Bldg., Barrington, N. J. 08007

☐ SEND FREE 164 PAGE CATALOG "H"

Charge my ☐ American Exp. ☐ BankAmericard ☐ Master Chg.

Interbank No._____

Card No._____

Expiration Date_____

30-DAY MONEY-BACK GUARANTEE. You must be satisfied or return any purchase in 30 days for full refund.

Send me the following:

Stock No.	Quantity	Price Ea.

Add handling charge $_____1.00

Enclosed is ____check, ____M.O. in amount of $_____

Signature_____

Address_____

City, State, Zip_____

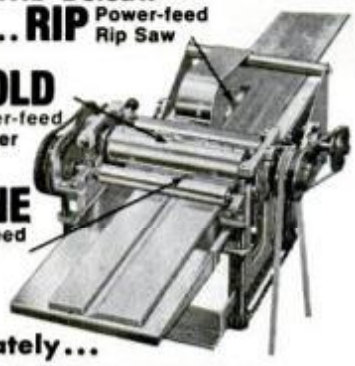
HELPING TO DEVELOP AMERICA'S TECHNOLOGY FOR OVER 30 YEARS.

Материал, защищенный авторским правом

NOW! Your home workshop can pay off BIG...

This one power-fed tool saws, planes & molds in one fast operation.

ONLY THE Belsaw WILL... RIP Power-feed Rip Saw



MOLD Power-feed Molder

PLANE Power-feed Planer

separately... or All in One Operation... – *a real money-maker for you!*

Only complete workshop tool of its kind in the world turns rough lumber into finished stock.

The BELSAW Planer/Molder/Saw is a versatile piece of machinery. It turns out profitable precision molding, trim, flooring, furniture...in all popular patterns. Rips, planes, molds separately...or all at once. Used by individual home craftsman, cabinet and picture framing shops, lumber yards, contractors and carpenters.

No previous experience necessary

Never before has there been a three-way, heavy-duty woodworker that does so many jobs for so little cost. Saws to width, planes to desired thickness, and molds to any choice of patterns. Cuts any molding pattern you desire. Provides trouble-free performance. And is so simple to operate even beginners can use it!

your own BUSINESS

Part time or full time – right at home

Men and women everywhere are using this low-cost powerfeed machine to start and build their own new businesses...and YOU can do the same. Supply lumber yards, contractors and carpenters in your area with door and window trim ...base shoe...bed mold...cove and quarter round...ALL of their trim. You can sell picture frame to lumber yards, paint stores, department stores...and direct to users.

SEND FOR FREE FACTS!

Read what these Belsaw owners say!

"I've been a planer man 44 years and now retired. The Belsaw has earned me $60,000 in eleven years with the only expense being $7.50. For the initial cost, it's the best investment I ever made."
Robert Sawyer – Roseburg, Oregon

"This machine pays for itself making money out of scrap boards. It is a very well built machine and I confess it is more than I really expected for the price. It does everything you say it will."
Stephen Schultz – Orangeville, Penna.

"I bought a batch of walnut in the rough, and after planing it on the Belsaw I figured I saved enough money to pay for two-thirds the cost of the Planer. It really does a good job."
R. S. Clark – Springfield, Ohio

"I make furniture, grandfather clocks and many other things. My Belsaw does nice work and I couldn't do my job without it. I really like it."
W. W. Robinson – Flat Rock, Illinois

...and from this well known authority –
"I recommend the Belsaw as the most useful shop tool any craftsman could own. We use one every day in the Workbench model shop...couldn't get along without it."
Jay Hedden, Editor
Workbench Magazine

Let Belsaw prove *YOU* can do it, too!

Try it in YOUR Shop...on our 30-DAY FREE TRIAL

No Obligation and No Salesman Will Call.

RUSH COUPON TODAY!

BELSAW POWER TOOLS CO.
907F Field Bldg.
Kansas City, Mo. 64111

BELSAW POWER TOOLS
907F Field Bldg., Kansas City, Mo. 64111

Please send me complete facts about PLANER – MOLDER – SAW and details about 30-day trial offer.

I understand there is no obligation and that no salesman will call.

Name _____

Address _____

City _____

State _____ Zip _____

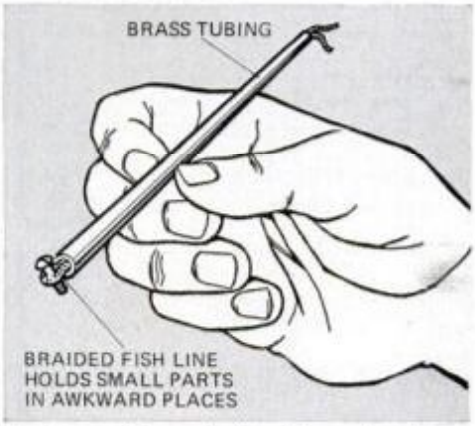
HINTS

FROM READERS

Cable stripper

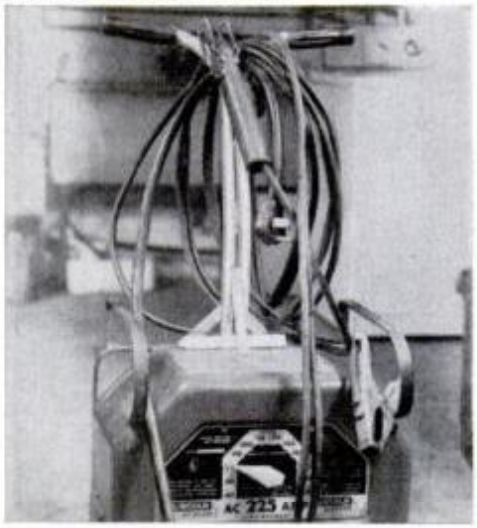
Make a cable stripper from a clothespin and a single-edge injector blade. Remove the clothespin spring and cut a 1¼-in. slot in one jaw. Glue the blade in the slot, cutting edge inward, and reassemble. Rotate the clothespin to cut the cable. —*Max Calkin*

Miniature snares



Hold small parts in otherwise inaccessible places with miniature snares made from brass tubing and braided fishing line.—*Ken Suiter*

Handy welder handle



Improve the portability of your welder or other bulky equipment by bolting a lawnmower handle to the machine.—*Dave Robinson*

Материал, защищенный авторским правом

Bring your car stereo or mobile CB home with this 12-v. power supply

by William D. Goldberg
PM photos: Madeline Silver

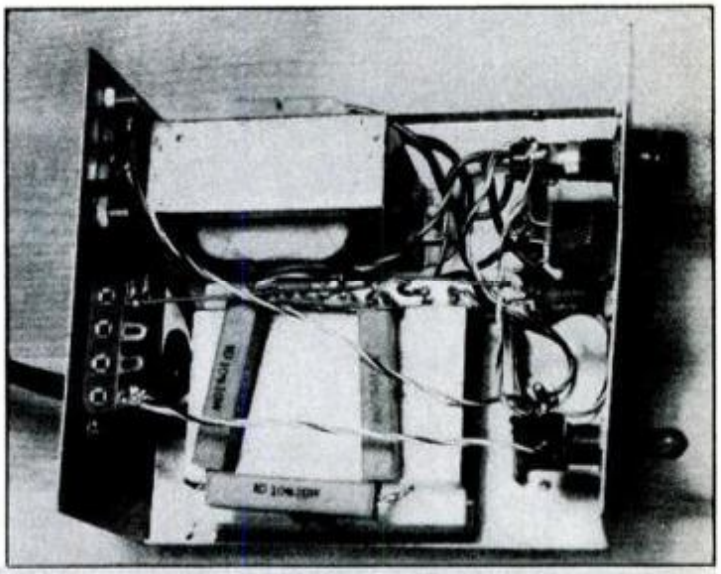
You can get double duty from your car's CB or stereo by playing it indoors; and it's safer from theft in your living room than in your driveway. All it takes is a simple power supply like this one to turn your home's 120-volt a.c. into a 12-volt d.c. supply that your car's electrical and electronic accessories can use. And you can build it for about $20.

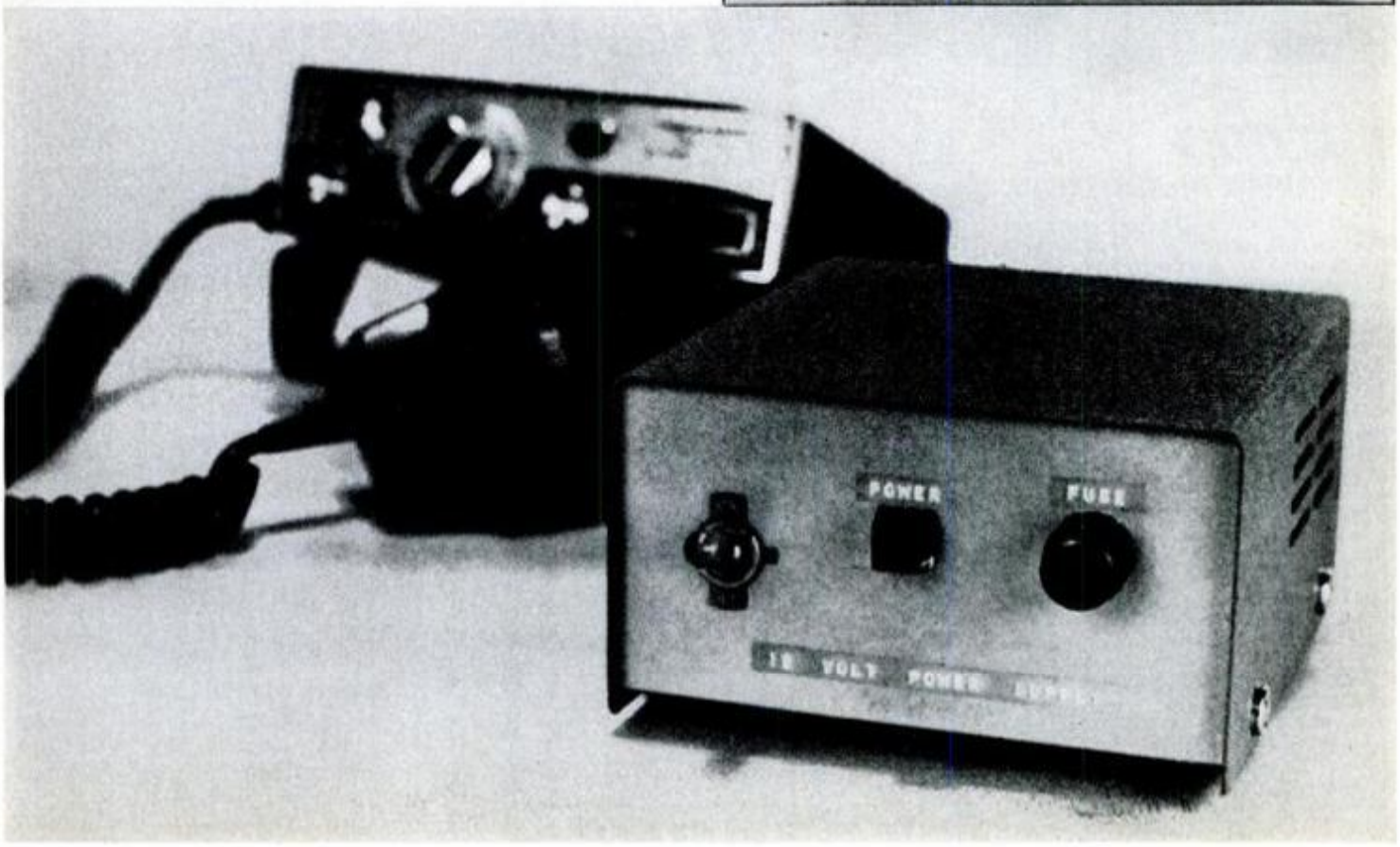
Construction is simple: Lay out all components in your cabinet approximately as shown at right. (Minor changes may have to be made if you use a different cabinet or components, but parts layout is not critical.) Using your components as templates, drill all mounting holes. To make the rectangular cutout for the screw terminal panel, drill a hole about 5/16 inch in diameter, mark the rectangle around the hole, then file out the square (you can also use a nibbling tool or keyhole saw).

Before mounting the transformer, you must identify its leads: The two black wires are the primary leads, and the two red wires and one yellow wire are the secondary leads. The yellow wire is a center tap from

(Please turn to page 176)

Easy to build and inexpensive, this power supply delivers 2 amps. of well-filtered d.c. to drive your car's CB or stereo tape unit from a 120-volt a.c. line.





Материал, защищенный авторским правом

Create a Family Treasure

Build one of our exquisite grandfather clocks. Create a real conversation piece and family heirloom. Kits are Red-i-Kut, easy-to-build, semi-assembled of solid ¾ in. kiln dried mahogany, cherry or walnut. Tubular bell or Westminster rod chimes. Spun brass Goddess Diana Lyre or Lady Florentine pendulums. Send $2.50 for set of three plans, AMERICAN CLASSIC, SPIRIT OF MOUNT VERNON and SPIRIT OF THE CENTURY plus full color descriptive literature, and specifications on all kits and movements. **Est. 1916 KUEMPEL CHIME CLOCK WORKS & STUDIO**, 21195 Minnetonka Blvd., PM-72, Excelsior, MN 55331.

WHIRL-AWAY SCALE PAINT RUST

New versatile tool. Attaches to any ¼" or ⅜" drill motor. Patterned after oil drilling rotary bit. WHIRL-AWAY, with its hardened steel pointed cutting discs, does away with the long, hard, laborious task of sanding, grinding and chipping away rust, paint, and other unwanted materials. Saves hours. Leaves surface clean, ready for treatment. Easy to use. Safety guard protects, makes it safe to operate. Lightweight — weighs only 1 lb. Complete satisfaction or money back. *Only* **$22.50 *ppd.***

RICHARD DEVANCE CO.—Dept. PM
P.O. Box A3877 Chicago, IL 60690

Buy Tools DIRECT at Rock-Bottom Prices!

STANLEY · SKIL · B&D · DISSTON · RIDGID · CHANNEL LOCK · Millers Falls · WEN · Rockwell · LUFKIN · DREMEL · S&K · Milwaukee · PROTO · KENNEDY · Starrett

6,000 NAME BRAND ITEMS

Buy direct from U.S. General's catalog and enjoy "Insider's Confidential" prices on hand tools, power tools, automotive tools, motors, handyman supplies—6,000 nationally advertised name brand items at rock-bottom prices. Save on all the famous names you know and trust — Stanley, Wiss, Disston, Skil, Kennedy, Lufkin, Rockwell, Black & Decker, plus many, many more.

Thousands of serious minded craftsmen, mechanics, homeowners and hobbyists each send us $1.00 just to get this big 204-page catalog of fantastic buys on brand name tools, hardware, and accessories.

Our bargains are too great and our prices too low for us to give away this big catalog to people who aren't really interested. So we ask for $1 simply to discourage curiosity seekers.

But the way we look at it, the catalog is REALLY free! You get a $1 Cash Certificate with your catalog. Spend the Certificate just like money with your first order. **Or** if you're not 100% satisfied with the catalog, send the Certificate back to us and we'll refund your dollar. (you keep the catalog.)

As an extra "thank you" for acting now, you'll **also** receive with your first order—no matter how small—a 10-piece High Test Steel Drill Bit Set (worth about $3.00) absolutely FREE. U.S. General Supply Corp., 100 General Place, Dept. 57, Jericho, N.Y. 11753.

©COPYRIGHT 1976 U.S. GENERAL SUPPLY CORP.

Who buys from U.S. General?

Thousands of individuals and companies. Here's a partial list of firms from our 1975-1976 customer list:

- **Bell Telephone • Bethlehem Steel • Kodak**
- **General Electric • General Motors Corp. • ITT**
- **Goodyear • IBM • Lockheed Electronics Corp.**
- **NBC • RCA • Rockwell International • NCR**
- **Magnavox • Sylvania • I. E. Dupont**

Same low prices for you-- no minimum order required!

U.S. General Supply Corporation
100 General Place Dept. 57
Jericho, N.Y. 11753

I enclose $1. Please send your new 204-page fully illustrated Confidential Tool & Hardware Catalog. Also include a Certificate worth $1.00 on my first purchase. If I am not 100% satisfied with the Catalog, my $1 will be immediately refunded.

(Print)
Name _____

Address _____

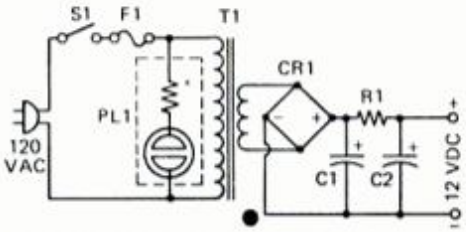
City _____ State _____ Zip _____

12-V. POWER SUPPLY

(Continued from page 175)

the secondary winding; you won't need it, so cut off this wire.

Mount the transformer, the switch and all terminal strips first. The bridge rectifier (CR1) is mounted on a five-terminal strip attached to the chassis just behind the front panel—you can just see it, a flat black box between the pilot light and fuse in the interior-view photo. Mount it horizontally, wired according to the schematic; be sure not to wire it to the center, grounded terminal of the strip. When soldering the rectifier's leads, be sure to clamp a heat sink (pliers or tweezers will do) to the leads, and don't use a soldering iron that's rated more than 30 watts.



*RESISTOR BUILT INTO LAMP ASSEMBLY

PARTS LIST

C1—2000-mf, 35-v. electrolytic capacitor (Radio Shack 272-1020)
C2—1000-mf, 35-v. electrolytic capacitor (Radio Shack 272-1019)
R1 (R1a, R1b, R1c)—1-ohm, 10-w. resistors (3) (Radio Shack 271-131)
T1—120-v. pri., 12.6-v. sec., 3-amp. transformer (Radio Shack 273-1511)
CR1—50-R.I.V., 6-amp. bridge rectifier (Radio Shack 276-1146)
PL1—120-v. neon lamp (Radio Shack 272-704)
S1—S.P.S.T. 120-v., 3-amp. switch (Radio Shack 275-602)
ST1—Screw terminals (Radio Shack 274-663 or 274-315)
F1—3-amp., 120-v. fuse and fuse holder (Radio Shack 270-1276; 270-364)
TS1, TS2, TS3, TS4, TS5—Terminal strips (Radio Shack 274-688)
Cabinet—3x5¼x5⅞" (Radio Shack 270-253)
Misc.—Line cord, hookup wire, rubber grommet, bolts, nuts and washers.

Resistor R1 is actually composed of three separate resistors, connected in series. Each is a 1-ohm, 10-watt type, for a total of 3 ohms and 30 watts.

When installing capacitors C1 and C2, be sure to follow proper polarity. Incorrect polarity will cause the circuit to malfunction and will ruin the capacitors. Again, do not use the grounded, center terminals of the terminal strips.

The circuit is simple: The transformer steps your 120-volt a.c. line power down to 12.6 volts. The bridge rectifier then converts this to pulsating d.c. Capacitors C1 and C2 and resistor R1 filter out the pulsations to minimize problems of hum or buzz. Output is 12 volts d.c. at 2 amps. continuous, 3 amps. maximum. ★★★

Материал, защищенный авторским правом

Car insurance: How your rates are set

You might be able to save some money once you understand the system.

by Robert Clayton

A great many people are in the dark as to what auto insurance is all about. How are insurance premiums established? Why are they going up? Can they be kept down? What do all those words in the policy mean?

Let's assume you need auto insurance and head for your local independent agent—a businessman who represents up to 20 different insurance companies. The first, most basic question he will have in determining which company is best for you is what type of coverage you want or need—and what amount. Here are the types of coverages:

Liability coverage

An automobile in operation can cause injury. Because this can happen any time you get behind the wheel of your car, liability insurance is the most important type of auto insurance you can carry. It protects you and your family against claims and judgments for damage or injury caused by the vehicle. Keep in mind that this does not cover your car, but, by covering damages or injuries which might have been caused by you, can protect you financially from far greater losses than you could possibly suffer through damage to your own vehicle.

Within specified limits, this type of insurance protects you and your family in almost any car you drive and even protects people who have borrowed your car. The important thing to remember is that liability insurance should be broad enough in scope to cover court costs, lawyer's fees, costs of appeal bonds, bail bonds and bonds to release any attachments on your assets.

Author Robert Clayton is president of the Independent Insurance Agents of America.

Medical payments coverage

Within specified limits, this insurance covers the costs of any medical expenses incurred by you or any relative living with you for any auto accidents, *even if you or they are pedestrians.* It also covers any medical expenses of a guest in your car or another victim in the accident.

Collision coverage

This protects your car if it is involved in an accident, irrespective of whom is to blame. With this coverage you are covered for the full amount of the damage to your car, less the deductible amount.

Comprehensive coverage

This insures your car against almost all losses, except for those involving collision. It covers loss or damage from things like fire, theft, vandalism and storms.

Rating factors

Now that we've outlined the types of auto insurance coverage that are available, we can go into the factors that go into each and which, in the final analysis, will determine just how much your insurance premiums will be. In order to do this, we will have to take each type of coverage separately, since they are not all arrived at in the same way.

Factors for liability

As we mentioned before, liability insurance covers damage and injury that you've caused—but not damage, injury or loss to you.

A. *Territorial rating.* The first determinant your insurance agent must consider is strictly geographical. The basic rate varies throughout the country, with each state being divided into "rating terri-

(Please turn to page 178)

EXAMPLES OF MULTIPLICATION FACTORS USED TO DETERMINE AUTO INSURANCE RATES*

	1. Effect of good-student discounts		2. Effect of driver-training discount		3. Effect of marital status		4. Effect of ownership of car		5. Car usage		6. Effect of driver's sex	
Age	With discount	Without discount	With training	Without training	Married	Single	Owner or principal operator	Not owner or principal operator	Pleasure	Drive to work or for business	Male	Female
17	2.70	3.50	3.10	3.50	1.95	3.50	3.50	2.75	3.50	3.65	3.50	1.75
18	2.50	3.30	2.90	3.30	1.85	3.30	3.30	2.55	3.30	3.45	3.30	1.60
19	2.30	3.10	2.70	3.10	1.75	3.10	3.10	2.40	3.10	3.25	3.10	1.50
20	2.10	2.85	2.55	2.85	1.65	2.85	2.85	2.25	2.85	3.00	2.85	1.25
21	2.05	2.50	2.50	2.50	1.50	2.50	2.50	1.90	2.50	2.65	2.50	1.15
22	2.00	2.35	2.35	2.35	1.40	2.35	2.35	1.70	2.35	2.50	2.35	1.10
23	1.95	2.20	2.20	2.20	1.30	2.20	2.20	1.55	2.20	2.35	2.20	1.05
24	1.90	2.05	2.05	2.05	1.20	2.05	2.05	1.35	2.05	2.20	2.05	1.00
25	†	1.90	1.90	1.90	†	1.90	1.90	†	1.90	2.05	1.90	1.00
26	†	1.75	1.75	1.75	†	1.75	1.75	†	1.75	1.90	1.75	1.00
27	†	1.55	1.55	1.55	†	1.55	1.55	†	1.55	1.70	1.55	1.00
28	†	1.40	1.40	1.40	†	1.40	1.40	†	1.40	1.55	1.40	1.00
29	†	1.25	1.25	1.25	†	1.25	1.25	†	1.25	1.40‡	1.25	1.00

*Multiplication factor can be converted to percent by moving decimal point two places to the right.
†Classed as nonyouthful driver. ‡If car is driven 10 miles or more to work or if it is used for business.

Материал, защищенный авторским правом

NEW Rod Builder's Handbook and Blank Catalog

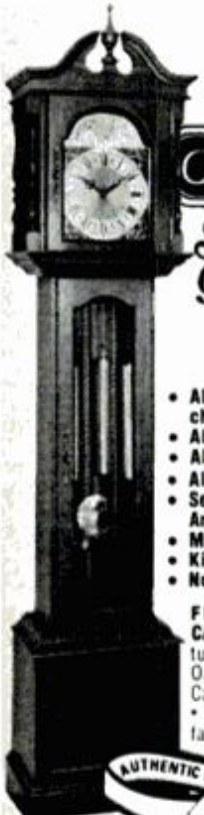
Build your own custom fishing rod.

Complete Blank Catalog also contains step-by-step instructions on guide spacing, selecting the right blanks and accessories, assembly information, and how to make a "diamond wrap" that really gives your rod that beautiful custom look.

Fenwick Dept. PM-02 , P.O. Box 729
Westminster, CA 92683
Send "ROD BUILDER'S HANDBOOK and BLANK CATALOG."
I have enclosed 25¢ to cover handling and postage.

Name_____
Address_____
City_____
State_____
Zip_____

fenwick
A SIGN OF A GOOD FISHERMAN



Crown of Fairhope

Solid Walnut Grandfather Case Kits

FROM UNDER $100

- All miters pre-cut—no extra charge
- All screwholes pre-drilled
- All critical parts pre-drilled
- All hardware including screws
- Selected kiln dried ¾" and 1" American Solid Black Walnut
- Maximum sap wood removed
- Kits individually cut
- Not mass produced

FULLY ILLUSTRATED COLOR CATALOG Great selection of furniture and clock do-it-yourself kits. Oak • Pine • Walnut • Mahogany • Cabinets • Tables • Chests • Chairs • Hall Trees • Mantel, Grandfather and Wall Clocks • SEND $1.00 (REFUNDED WITH FIRST ORDER)

AUTHENTIC REPRODUCTION

FREE BOOKLET "100 Woodworking & Finishing Tips" If you buy catalog now!

Crown of Fairhope®
P.O. Drawer G-141 • Fairhope, Ala. 36532
Visit Our Plant, Home of...
Finer Kits at Factory Prices

CAR INSURANCE

(Continued from page 177)

tories." A rating territory could be part of a county, a rural area, a suburb, a large city—or even part of a large city. For each such territory, statistics have been compiled about claims involving cars owned in that area, irrespective of where the accident occurred. If a driver from Missouri is responsible for an accident which occurred in Florida, it is the Missouri rates that will be affected and not Florida's. The basic rate is derived from the "loss experience" of a rating territory. But this is for the basic rate. Other factors are then applied to arrive at your particular premium rate. For now, remember that each rating territory starts from its own base.

B. *Characteristics of the insured and his vehicle.* This is a factor—a multiplier—which is used to modify the basic rate determined from your rating territory. A factor of 1.5 means that you would be required to pay 50 percent more than the base rate for your liability coverage. A factor of 2.0 would double your liability premium, while a 3.0 would triple it.

Editor's note: The system for determining auto insurance rates given here is for motorists insured by all insurance companies nationwide. Motorists unable to find a company willing to insure them must turn to the assigned-risk plan at generally higher rates.

Once we reach the point of evaluating the driver, there are a bewildering number of variables which we have attempted to simplify with the accompanying charts.

1. *Youthful operator.* Even if you are above the age where you could be considered a youthful operator, you may have a son or daughter who puts you into this category—or will in a few years. Knowing what the variables are could help you save quite a bit.

■ *Good-student discount.* Let your agent know whether your son or daughter qualifies for this discount. This can amount to quite a bit. If your basic territorial rate is $100, a 17-year-old son without a good-student discount could drive this premium up to $350 while, with a good discount, the premium would be $270.

To be eligible for a good-student discount, your son or daughter must be in the top 20 percent of the class, have a average of B or better or be mentioned on the "dean's list," "honor roll" or the equivalent.

(Please turn to page 180)

TWO-DIGIT AUTOMOBILE COST-RATING SYSTEM

FIRST DIGIT:

For 1976 and later model years—

Classification	Retail price of new car
1	$ 0 - $1,600
2	1,601 - 2,100
3	2,101 - 2,750
4	2,751 - 3,700
5	3,701 - 5,000
6	5,001 - 6,500
7	6,501 - 8,000
8	8,001 - 10,000
9	Not used
10	10,001 - 12,500
11	12,501 - 15,000
12	15,001 - 17,500
13	17,501 20,000
14	20,001 and above

For 1976 and earlier model years, Class 7 is $6,500 to $10,000. Anything above $10,000 is 5% per $1,000.

SECOND DIGIT:

Class	Auto age
1	First model year (as of Oct. 1 of previous year)
2	One to two years old
3	Two to three years old
4	Three to four years old
5	Four to five years old
6	Six years or older (a 10-year-old and a 17-year-old car are rated the same)

Note: For calculation of premiums, classes 2 and 3 carry the same premium. Similarly, classes 4 and 5 are grouped for calculation of premium.

Sample of rating classification: A car rated at 8-2 is a two-year-old auto that retailed new between $8,100 and $10,000.

NONYOUTHFUL OPERATORS*

Status of operator	Pleasure use	Drive to work 10 miles or less	Drive to work more than 10 miles	Business use	Farm use
Only operator in household is a female age 30-64	.90	1.05	1.30	1.35	.75
Principal operator is age 65 or over	.95	1.10	1.35	1.40	.80
All other	1.00	1.15	1.40	1.45	.85

*Multiplication factor can be converted to percent by moving decimal point two places to the right.

Richard Petty,
NRI Automotive Consultant,
and America's Winningest
Stock Car Driver.

Richard Petty says, "I like the way NRI home training teaches professional auto servicing."

Their Up-To-Date Courses Can Prepare You for Part-Time Income or a Career

When your life depends on the mechanical performance of a car, you get to know and appreciate top mechanics. And believe me, they're few and far between. If there ever was a field where opportunity is knocking, this is it.

I'm sure glad to see professional home training like the two NRI courses come along. With NRI training, you can keep your present job while you learn, and you get the kind of hands-on experience that pays off under the hood. It's a lot of training for the money.

Learn Auto Servicing Fast
NRI's Basic Professional Repair Course covers the basics of auto repair in 30 lessons. From headlight to taillight, you'll learn all you need to know, quickly. Basic home training includes eight important service items, including an Inductive Pick-Up DC Power Timing Light, Ignition and Electrical Systems Analysis and Tune-Up Instrument, Tune-Up tool kit, and more.

Become a Professional Mechanic
NRI's 70-lesson Master Automotive Technician Course includes the equipment, tools and training materials you need to be a real pro. In addition to personal services and "bite-size" lessons, you receive 10 pieces of auto service equipment, including an Ignition Analyzer Scope, Diagnostic Engine Analyzer, Inductive Pick-Up DC Power Timing Light, full set of tools, Torque Wrench, 4 different test gauges, and more. You'll learn to service electronic ignition systems, and even auto air conditioning . . . with an air conditioning systems analyzer and a refrigerant systems leak detector.

Train with the Leaders—NRI and McGraw-Hill
No other school has NRI's experience in home training . . . or McGraw-Hill's background in continuing education. Mail the coupon and check out what they have to offer. Over a million students have trained at home the NRI way, and you can too.

If the coupon is missing, write: NRI Automotive School; 3939 Wisconsin Avenue; Washington, D.C. 20016.

Pictured above is just some of the professional equipment included in NRI's Automotive training programs.

RUSH FOR FREE CATALOG

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

Please check for one free catalog only. NO SALESMAN WILL CALL.

- ☐ AUTOMOTIVE MECHANICS COURSES
- ☐ CB, Color TV/Audio, Communications and Computer Electronics Courses
- ☐ Air Conditioning, Refrigeration, and Heating Courses.
- ☐ Approved Under GI BILL if taken for career purposes, Check for details.

Name _____ Age _____
(Please Print)

Address _____

City/State/Zip _____

A National Home Study Council Accredited School

946-027

Материал, защищенный авторским правом

✱ PUT THE "IGNITION OF THE FUTURE" ON YOUR CAR TODAY!
MODERNIZE and Bring Your Car "UP-TO-DATE" with the MOST EFFICIENT Ignition ever invented!

✱ End "Tune-Up" Problems FOREVER
caused by Points and Condensor

U.S. Patents Pending

ALLISON XR-700
with the Exclusive...Solid-State Voltage Regulator.

The ONLY Ignition System that has COMPLETELY overcome the Problems that have baffled the Auto Industry for Years!
SO RELIABLE (99.9+%)...SO PERFECTED...
that it will soon be STANDARD on most Future new Cars!

ALLISON Rated #1 by Official Testing Laboratory as the BEST "Fuel Saving" Ignition System of ALL the Different Ignition Systems Tested!

✱ The "XR-700" is a COMPLETELY NEW Ignition System employing the Most Advanced Technology, that replaces the inefficient Points and Condensor with an infrared Light Beam to Trigger the Latest type of Solid-State Power Components. Once installed...."XR-700" has NO moving Parts to wear out or adjust. It works without Friction or wear. Not affected by Dirt, Oil, Moisture, Vibration or extreme Engine Temperatures! RUGGED and RELIABLE!
✱ The "XR-700" is engineered to OUTLAST YOUR CAR!

✱ The "XR-700" produces the MAXIMUM "High Energy" Long Duration Spark...from your present car's Ignition Coil. This permits the Positive Firing of Spark Plugs, even under the most Adverse conditions. Also, Eliminates "Engine Misfire," resulting in more COMPLETE COMBUSTION! Thus you get IMPROVED Fuel Mileage, a HIGHER Performance Level... keeps Plugs FROM FOULING and gives LONGER Plug Life!

Customers Report:
★ "IT MORE THAN PAYS FOR ITSELF!
★ INCREASES Gas Mileage up to 30%!
★ SAVES Money on Costly "Tune-Ups"!
★ Gives Continuous PEAK Performance!
★ QUICKER Starting in Any Weather!
★ Smoother Running...Faster Acceleration!
★ Plugs Last Up to 4-Times LONGER!"

✱ Reliability PROVEN in Millions of Customer Miles to be so exceptionally GOOD...that every "XR-700" has a LIFETIME WARRANTY! FREE Repair or Replacement for as long as you OWN the Unit!...and even if you CHANGE Cars, Allison will supply you the necessary PARTS to fit ANY Point-Type Distributor...FREE! (Include $2 for Postage & Handling).

✱ FITS ALL CARS, Domestic & Foreign. 4, 6 or 8-Cylinder.

★ DO-IT-YOURSELF...EASY INSTALLATION!
The New "XR-700" is Completely Factory Assembled... Thoroughly TESTED! New Precision "Drop-in" Mounting Bracket, with color-coded, "Snap-Together" wire connections
No Distributor Removal necessary...Protected against "Incorrect Hook-up!

● Thousands sold at $59.95 ● ONLY
NOW! Allison's Production Technology offers you the same Premium Quality XR-700 at this SPECIAL LOW Price...
$39.95 COMPLETE (Cal. Res. add Tax)
THAT'S EVERYTHING...INCLUDING POSTAGE & INSURANCE

★ ORDER WITH CONFIDENCE...
install the "XR-700", and prove to your own SATISFACTION that it is as advertised, or return it within 30 days for a FULL Refund of the Purchase Price

✱ SAVE! ORDER FACTORY DIRECT.
Send Check or M.O., State Car Make, Year, No. Cylinders

✱ MASTER CHARGE or BANKAMERICARD Card Holders: ORDER by TOLL-FREE PHONE. (800) 423-6525, Ext. 2 or Send us (1) Your Number, (2) Interbank No., (3) Exp. Date.

✱ SEND for FREE BROCHURE and Comparison Sheet.

"CB" USERS: The "XR-700" completely ELIMINATES the Major Cause of Primary (Ignition Noise) Interference.

● If you have already installed a "Capacitive Discharge" Ignition ● Convert your "C-D" Unit to BREAKERLESS! INCREASE ITS EFFICIENCY with "XR-CD"...only $29.95

✱ America's Oldest and Largest Manufacturer of Opto-Electronic Ignition Systems. ©

ALLISON AUTOMOTIVE CO.
1267 – PM, East EDNA PL., COVINA, CAL. 91722

CAR INSURANCE

(Continued from page 178)

■ *Driver training discount.* It pays to take driver training as the figures in the table indicate. The same 17-year-old without a good-student discount, but with driver training, would have a factor of 3.10 instead of 3.50.

If he had both a good-student discount *and* driver training, the factor for the 17-year-old would drop to 2.50 (it could be even lower, as we will show later).

■ *Marital status.* If your son is married, the premium will be far less than if he is single. This doesn't reflect prejudice on the part of the insurance companies. Instead, it reflects statistics which show that married drivers have a lower accident rate than single drivers. This is particularly true of young males.

■ *Effect of ownership of car.* It is cheaper for you if the ownership of the car remains in your name and not in junior's. If we now put together most of the factors, we find that if your son has a good-student discount, a driver training discount, is single and is not the owner, the factor is 1.80, instead of the 3.50 it would be without the discounts we've discussed so far. That same multiplier on a base $100 premium means that liability coverage would cost you $180 compared to $350.

■ *Car usage.* How you use the car also affects the premium rate. Again, the comparison has been made for the youthful driver.

■ *Effect of driver's sex.* An unmarried young female pays far less than does her male counterpart. If the female is married, she is treated, as far as insurance ratings are concerned, as a nonyouthful operator.

2. *Nonyouthful operators.* The nonyouthful operator gets quite a break, rating-wise. Who qualifies as a nonyouthful operator? Obviously, all men over the age which qualifies them as youthful operators fall into this category. So do unmarried women, age 30-64, and married women of any age.

Strange as it may seem, a 17-year-old female who marries is considered a nonyouthful operator, while her husband, perhaps a few years older than she, is still considered a youthful operator.

All men and women over the age of 65 are, obviously, nonyouthful operators, but are classified separately.

3. *Driver safety record.* Safety rating factors are divided into subclasses 0, 1, 2, 3 and 4 based on the number of driving record points accrued by the driver.

One point is assigned for each accident caused by the driver or anyone in his household which results in bodily injury, death or damage in excess of $200. In addition, a point is assigned on conviction for any moving traffic violation for which the operator's license was suspended or revoked.

Two points are assigned for the accumulation of points under a state point system or a series of convictions which result in the requirement of the operator to file evidence of financial responsibility under any financial responsibility law.

Three points are assigned to anyone convicted of driving while under the influence of drugs or alcohol, failure to stop and/or report an accident in which the operator was involved, homicide or assault arising out of the operation of a vehicle or driving during a period when the operator's license was suspected or revoked.

4. *Car safety rating factors.* If we forget, for the moment, about driver capability, how much does the type of car contribute to accident frequency? Enough so that rating factors have been established. Because they have contributed to the frequency of accidents out of proportion to their numbers, high-performance cars have been penalized most heavily in these rating so that owning such a car can add 30 percent to your liability insurance premium, while an intermediate-performance car can increase your premium by 15 percent.

EFFECT OF DRIVER SAFETY RECORD ON RATING FACTOR*

Risk code	0	1	2	3	4
Single car	0.00	+0.40	+0.90	+1.50	+2.20
Multicar (for each car)	–0.15	+0.05	+0.30	+0.60	+0.95

*Multiplication factor can be converted to percent by moving decimal point two places to the right.

Factors for comprehensive

In many respects, comprehensive coverage rating factors are similar to those of liability coverage. To begin with, there is a territorial rating to establish the base rate. Driver characteristics are also rated in much the same way as for liability coverage. Since comprehensive coverage is for the protection of your vehicle from damage and since ex-

(Please turn to page 182)

Материал, защищенный авторским правом

Super

BODYBUILDING COURSE –

INTRODUCING

THE BODYBUILDING SYSTEM THAT GUARANTEES –

YOU'LL PUT ON INCHES OF POWERFUL MUSCLES ON YOUR BODY!

At last, NEW bodybuilding secrets are now available for your use. Finally, after years of experimenting we have come up with the fastest muscle building system in the world. Our course really works – **thousands** have taken our course and have obtained fantastic results. Right in the privacy or your own bedroom, you can completely transform your body.

SEE YOUR MUSCLES GROW DAY BY DAY!

You can have POWERFUL MUSCLES FAST . . . not by years and years of hard work . . . but by simply following our fascinating system . . . a system that works so fast you can see results from day to day! Isn't that the kind of course you want? We absolutely guarantee results.

HERE ARE JUST A FEW OF THE LETTERS WE HAVE RECEIVED

"Wow! I'm making fantastic gains, following your new method of muscle building. I never knew it could be so easy to build muscles."
J. Johnson

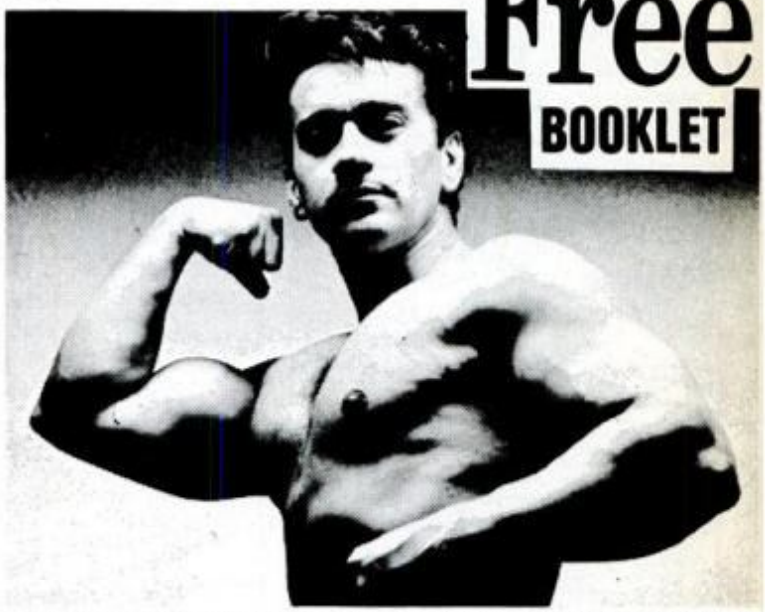
"I was a skinny weakling when I enrolled, now I've gained 30 pounds in just 45 days. I am truly amazed, I'm going to be dynamite on the beach."
B. Abbott

"In just 3 weeks I have gained 1½" on my arms and 4" on my chest. I have also lost 4" off my waist. Your course is just great!"
D. Roberts

"I'm transforming all the fat off my body and changing it into rock-hard muscle. It's amazing I have lost 8" off my waist. I can actually see my muscles growing from day to day."
P. Williams

"I have gained 20 pounds in just 30 days and I have gained over 6 inches on my chest. I find that my power has doubled. In sports I am a winner in everything I do."
B. Daniels

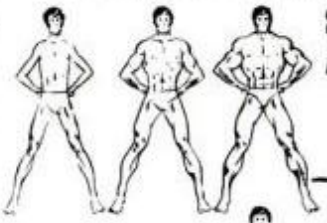
"I have gained 5" on my arms and 12" on my chest, while losing 3" off my waist. I have tripled my power and speed. Thanks for what you have done for me!"
M. Robinson



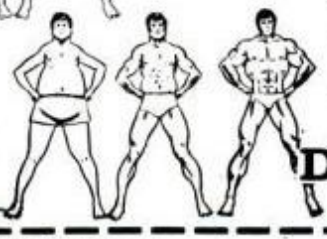
MORRIE MITCHELL GAINED 65 POUNDS OF MUSCLE WHILE FOLLOWING OUR 'REVOLUTIONARY NEW METHODS' ON BODYBUILDING.

TAKE YOUR CHOICE! You Can Do This...

★ DOUBLE OR TRIPLE YOUR STRENGTH in record time! It wouldn't take long before you can perform feats of strength.



SKINNY? MUSCLES WILL APPEAR . . . ALMOST LIKE MAGIC!



FAT? FAT WILL DISAPPEAR – REPLACED BY MUSCLES!

YOUR NEW MUSCLES WILL FEEL LIKE DYNAMITE!!

FREE!

Universal Bodybuilding
Box 6694, Dept J-1
Detroit, Mich. 48240

Shoot the 'works' to me free! Rush me all that free muscle-building information, so that I can add inches of powerful muscles – all in the privacy of my home.

(Please print)

Name _____ Age _____

Address _____

City _____ State _____ Zip _____

MAIL THIS COUPON TODAY

BIG MONEY AS A
Professional Clocksmith
Learn clock repair in your spare time. LOW tuition. Specialized knowledge in this VITAL field makes YOUR time valuable. ACT NOW! Free details. No obligation. No salesman will call.
NO TEDIOUS WATCH REPAIR
School of Professional Clocksmiths
P.O. Box 178 (AM18)
FRANKSTON, TX. 75763
NAME
ADDRESS
ZIP

4000 ITEMS FOR THE WOOD
CRAFTSMAN and HOME WORKSHOP
144 Pages!
• Amaranth • Cocobolo • Red Oak • Siam Teak • Vermillion • Cherry • Ebony • Rosewood • Satinwood • Zebra • Mahogany • Aromatic Red Cedar
Discounts on STANLEY Power Tools
Domestic and imported hardwoods! Also thousands of Lamp Parts, Cabinet Hardware, Upholstery Supplies, Clock, Furniture and Picture Kits, Inlays, Picture Frame Moldings, Hand and Power Tools.
MAIL COUPON FOR NEW CATALOG
CRAFTSMAN WOOD SERVICE CO. Dept. A-27
2729 S. Mary St., Chicago, IL. 60608
Send new 144 page Craftsman Catalog. I enclose 50c for handling, postage.
Name
Address
City State Zip

What do you have that sticks or squeaks?
WD-40 will fix it fast!
WD-40
- Lubricates and protects.
- Drys wet ignitions.
- Loosens rusted parts
- Cleans chrome parts.
- Prevents corrosion.
No toolbox is complete without it.
Pick up a can at your favorite store. Try it.
WD-40 COMPANY
1061 Cudahy Place, San Diego, CA 92110

CAR INSURANCE

(Continued from page 180)

pensive cars generally cost more to repair than inexpensive cars, there is a new rating factor considered—the cost of the vehicle. A second factor is the age of the vehicle, since the value decreases as the age increases (although replacement parts for an older car are not necessarily cheaper than those for a newer auto).

Factors for collision

Basically, the rating factors for collision coverage are calculated in the same way as for comprehensive. The basic rate is set, using a territorial rating factor and is then modified on the basis of driver characteristics (age, sex, marital status, type of driving, safety record) and cost and age of the vehicle.

There is one discount available only for collision coverage which can be called, for want of a better name, "bumper discount." If you own a 1972 or later vehicle with a bumper which has passed front and rear impact tests, speak to your agent about a discount. You may be entitled to a 10 percent cut on your collision premium if your car is one of those that qualifies.

Keeping costs down

Now that we've established there is no mystery regarding how insurance premiums are arrived at, what can you do to keep them as low as possible without sacrificing the protection you need?

To begin with, check with your agent regarding safe-driver plans, which are available in many states. Where available, such plans may save you as much as 20 percent on your premiums.

Not all insurance companies charge the same amount. But watch out. Some companies who charge less also offer less in terms of the coverage extended to you.

Make sure your agent knows it if your son or daughter qualifies for a good-student and/or driving training discount. If your car meets the federal bumper-impact standards or you are in a car pool, you may be eligible for further discounts.

More than one car?

Do you have more than one car in your family? Be sure they are registered in one name so that you qualify for a multicar discount.

Consider higher deductibles on your coverage for collision, fire and theft. You can make substantial savings with higher deductibles, since auto insurance is intended to protect you from major loss rather than minor fender benders. However, be careful not to set deductibles at a level higher than you can comfortably afford in the event of loss or accident. Again, your agent can give you expert advice on the level of deductibles which is right for you.

If your car is five or more years old, you might consider dropping any collision coverage you carry. The cost of such coverage may not be much of a bargain when compared with the replacement cost of your car.

If your son or daughter marries, inform your agent. Your insurance premium will be reduced immediately. The minute your daughter is married, your insurance would be no more than for any adult over 25, while, even with young male drivers who marry, there is a substantial reduction.

CAR SAFETY RATING FACTOR*

For 1971 and later model automobiles

Single car	Factor
Standard performance	0.00
Intermediate performance	+0.15
High performance	+0.30
Sports	+0.15
Rear engine	0.00
Multicar	
Standard performance	−0.15
Intermediate performance	0.00
High performance	+0.15
Sports	0.00
Rear engine	−0.15

For 1970 and prior model automobiles

Single car	
Nonhigh performance	0.00
High performance	0.00
Multicar	
Nonperformance	−0.15
High performance	−0.15

*Multiplication factor can be converted to percent by moving decimal point two places to the right.

Pleasure cars

Premiums go down if a car used to commute to work is no longer used for that purpose. Cars used for pleasure only are a lower accident risk and this is reflected in their lower insurance premiums. Currently, there are small-car discounts which can also lower your premiums.

There may be other savings for which you qualify so, for an overall appraisal of your auto insurance and for tips from a professional to keep your costs down, check with your agent. ★★★

E. S. Schechter & Co.

Know your car inside and out.

Your car can run better, last longer.

Know how to fix it...to tune it...to service it...to keep it running right. The TOTAL SERVICE MANUAL for your car will show you how to do everything from a minor adjustment to a major repair.

TOTAL SERVICE MANUALS are digests of official factory workshop manuals. Each one is carefully rewritten for use by the do-it-yourself car owner. Clear and easy to follow, yet complete and detailed enough even for professional use. You get all the important information plus hundreds of the best pictures, diagrams, and specifications.

TOTAL SERVICE MANUALS

Telephone orders (516) 676-8043

1018 **ALFA ROMEO** 55-65 covers all models inc 2600 ..... $7.95
1713 **ALFA ROMEO** 62-75 all models w/carbs $9.95
8424 **AMC PACER** 75-76 covers all models $6.95
1649 **ASTON MARTIN** 21-58 covers all models $9.95
8259 **AUDI 100LS** 70-76 covers all models $7.95
8193 **AUDI FOX** 73-75 covers all models $7.95

0916 **AUSTIN AMERICA** 68-71 covers all models $8.95
0846 **AUSTIN HEALEY 100/4** covers BN1 & BN2 ..... $10.95
1203 **AUSTIN HEALEY 100/6 & 3000** 56-68 all mdls $9.95
0858 **AUSTIN HEALEY SPRITE** 58-74 covers all models $8.95
0752 **AUSTIN MARINA** 73-74 sedan and GT coupe $8.95
0379 **BARRACUDA & CHALLENGER** 65-72 all models $8.95

0503 **BLAZER, CHEV** 59-73 for all 2 & 4 whl dr models $7.95
8537 **BMW 1600- 2000, 2002** 59-75 all models inc TI $9.95
9760 **BMW 2500, 2800, 3.0** inc Bavaria and CS $9.95
0978 **BOBCAT, MERCURY** covers all models thru 76 ..... $7.75
0504 **BRONCO, FORD** 66-73 all 2 & 4 whl drive models $7.95
0679 **BUICK** 55-75 covers all models $9.75

0001 **CADILLAC** 61-66 factory manual ... give year $8.95
0013 **CADILLAC** 67-70 factory manual ... give year $10.95
0014 **CADILLAC** 71-74 factory manual ... give year $13.95
0674 **CAMARO** all inc SS, Rallye, Sport, Z28 — 67-74 ..... $7.75
8423 **CAMARO** 75-76 covers all models $6.95
1210 **CAPRI 1600** covers all models — 68-73 ..... $8.95

9692 **CAPRI** 70-74 for all 4 & V6 models $8.95
9557 **CAPRI** 75-76 covers all models inc Capri II $8.95
1734 **CHARGER** 67-70 for all models inc 500 & R/T $8.95
8212 **CHARGER** 71-75 covers all models $8.95
0383 **CHEVELLE** 64-75 inc Monte Carlo, El Camino $8.95
8460 **CHEVETTE** 76-77 covers all models $6.95

1064 **CHEVROLET** 32-54 tune & service all 6 & V8s $2.50
0448 **CHEVROLET** 55-67 inc Impala, Bel Air $8.95
0870 **CHEVROLET** 68-76 all full size models $8.95
8187 **CHEVY II** 62-68 covers all 6 & V8 models $8.95
8200 **CHEVY PICK-UPS** 70-75 all models to ¾ ton $7.95
8201 **CHEVY VANS** 67-74 all models and GMC vans $7.95

1145 **CHRYSLER** 55-71 covers all models $8.95
9588 **CITROEN ID, DS** 67-73 for all models ID, 20, 21 ..... $9.95
8539 **CITROEN SM** factory service manual $19.95
8264 **COLT, DODGE** 71-75 covers all models $7.95
8211 **COMET** 71-76 covers all 6 & V8 models $8.95
8212 **CORONET, DODGE** 71-75 covers all models $8.95

1118 **CORTINA** 67-68 all models inc 1600, Lotus $9.95
0921 **CORTINA** 69-70 covers all models $8.95
0477 **CORVAIR** 60-69 covers all models produced $9.95
1735 **CORVETTE** 53-56 covers all 6 & V8 engines $8.95
0478 **CORVETTE** 57-64 covers all models $9.95
8429 **CORVETTE** 65-71 covers all models $9.95

9481 **CORVETTE** 72-76 all 327, 350, 427, 454 models $9.95
1756 **CRICKET, PLYMOUTH** 70-73 also covers Avenger $8.95
9440 **DART, DODGE** 65-67 covers all models $8.95
8188 **DART & DEMON** 68-76 covers all models $8.95
0766 **DATSUN 210** 73-74 covers all models $8.95
1726 **DATSUN 240Z/260Z** 70-74 covers all models $8.95

1551 **DATSUN 510** 68-73 covers all sdn & wagon mdls $7.95
0753 **DATSUN 610** 73-75 for all 1800 & 2000 models $8.95
0935 **DATSUN 710** 73-75 covers all models $8.95
0918 **DATSUN 1200** 70-73 covers all models $8.95
1258 **DATSUN 1600/2000 SPL & SRL 311 sport** $7.95
8515 **DATSUN 620** 75-76 'it Hustler' pick-up $8.95

8430 **DATSUN PICK-UP** 68-74 covers all models $7.95
1145 **DODGE** 55-71 includes Monaco, Polara $8.95
0871 **DODGE** 72-75 for all Polara & Monaco models $8.95
8208 **DODGE RAMCHARGER** 74-75 covers all models $7.95
8564 **DODGE PICK-UP** 68-75 covers all models $5.95
8203 **DODGE VANS** 67-74 100, 200, 300 Plymth $7.95

8192 **DUSTER** 70-76 for all models inc. Scamp $6.95
0381 **FAIRLANE** 62-70 covers all models $8.95
9422 **FALCON**, 60-63 all models $5.00
9874 **FALCON 6, FORD** 64-70 all 170, 200 & 250 eng $6.95
0480 **FALCON V8, FORD** 65-71 all 289 & 302 eng $8.95

0913 **FERRARI 250** all models plus 340, 375, 500 ..... $19.95
0976 **FIAT X1/9** 73-75 ..... $7.95
9776 **FIAT 124** 67-75 sdn, sta wgns inc TC, spcl $7.95
0844 **FIAT 124 SPORT** 67-74 covers coupe & conv mdls $8.95
9640 **FIAT 128** 69-75 all models inc SL, Rally $9.95
1201 **FIAT 850** 64-74 all sedan, coupe, spider mdls $9.95

9526 **FIAT 1300, 1500** 61-67 covers all models $9.95
0675 **FIREBIRD** covers all models — 67-74 ..... $7.95
1149 **FORD** inc Galaxie, LTD, Custom XL — 55-67 ..... $9.95
0872 **FORD** 68-76 inc Galaxie, LTD, Custom & wgns $6.95
0879 **FORD COURIER** 72-75 covers all models $7.95
8205 **FORD PICK-UPS** 70-75 for all models to ¾ ton $7.95

8204 **FORD VANS** 66-74 Econoline, 100, 200, 300 models $7.95
0009 **GRANADA** 75-76 factory manual ... give year $18.95
8210 **GREMLIN & HORNET** 70-74 all 6 & V8 models $8.95
0644 **HONDA 360, 600, Z** — all models $8.95
0765 **HONDA CIVIC** 73-74 for all models except CVCC $8.95
8601 **HONDA CIVIC CVCC** 75-76 ..... $8.95

8206 **INTERNATIONAL SCOUT** 67-73 800, A, B, II mdls $7.95
1207 **JAGUAR XK120, 140, 150** & Mk 7, 8, 9 — 48-61 ..... $9.95
0924 **JAGUAR 55-69** sdn mdls 2.4, 3.4, 3.8, 240, 340 ..... $8.95
0923 **JAGUAR E-type** 61-72 covers all 6 cyl models $8.95
8514 **JAGUAR XJ6** 68-75 covers all 4.2 models $8.95
8196 **JAGUAR V12** 72-74 for all E & XL models $7.95

1291 **JAVELIN & AMX** 68-71 covers all mdls inc. SST $8.95
9769 **JEEP** 50-65 4 cyl. 6 cyl. sta. wagon & trucks $12.95
8207 **JEEP** 66-74 Wagoneer, Cherokee, Commando $7.95
9806 **JEEP UNIVERSAL CJ-2A** $12.95
0509 **JEEP** 53-76 for all CJ-3, CJ-5, CJ-6 models $9.95
1254 **LANDROVER** 59-76 all 2, 2A, 3 models $9.95

1149 **LINCOLN & MERCURY** 55-70 covers all models $9.95
0004 **LINCOLN** 69-73 factory shop manual ... give year $14.95
0015 **LINCOLN** 74-76 factory shop manual ... give year $18.95
8190 **MATADOR, AMC** 71-74 covers all 6 & V8 models $6.95
9875 **MAVERICK** 70-72 covers V8 302 CID models $6.95
0481 **MAVERICK** 69-71 6 cyl. 170, 200, 250 cu. in. eng $6.95

8211 **MAVERICK** 73-76 all 6 & V8 models, inc Comet $6.95
0835 **MAZDA RX-2** 70-73 covers sedan & coupe mdls $8.95
0371 **MAZDA RX-3,100** 70-74 covers all models $7.95
0680 **MAZDA PICK-UP** 72-75 B-1600 & rotary eng. mdls $7.95
8340 **MAZDA 616** 70-73 covers all models $9.95

0593 **MAZDA 808, 818** 72-75 covers all models $8.95
0573 **MAZDA 1500, 1600** 67-74 covers all models $8.95
1009 **MERCEDES-BENZ 190** 59-68 B, C & 200 models $9.95
1027 **MERCEDES-BENZ** 57-67 inc 190SL, 190d, 300d, 600 ..... $6.95
1746 **MERCEDES-BENZ 220** 59-65 covers all mdls $9.95
9463 **MERCEDES-BENZ 220** 68-72 mdls except Diesel $9.95

1747 **MERCEDES-BENZ 230** 63-68 inc. 230S & SL $9.95
1748 **MERCEDES-BENZ 250** 65-68 covers all models $9.95
9484 **MERCEDES-BENZ 250** 69-72 covers all models $9.95
9485 **MERCEDES-BENZ 280** 68-72 covers all models $9.95
0416 **MERCEDES-BENZ** V8, 280, 300, 350, 450 mdls $9.95
8439 **MERCEDES-BENZ** 74 tune-up all models $7.95

0005 **MERCURY** 69-73 factory shop manual ... give year $14.95
0016 **MERCURY** 74-76 factory shop manual ... give year $18.95
0916 **MG 1100** 62-67 covers sport sedan $8.95
0858 **MG MIDGET** 58-74 covers all models $8.95
1105 **MG T** 36-55 all TA, TB, TC, TD, & TF mdls $9.95
1106 **MGA & MGB** 55-69 inc 1500, 1600 & twin cam mdls $9.95

0857 **MGB, MGBT** 62-74 covers roadster and coupe $8.95
8396 **MGC** factory manual $16.95
0917 **MINI** 59-72 for Austin, MG models inc. Cooper $8.95
1109 **MORGAN** 36-72 covers 4 & plus 4 models $9.95
9876 **MUSTANG II** 74-76 covers 200 & 250 engines $8.95
0479 **MUSTANG V8** 65-73 289, 302, 351, 390, 427, 428 engs $8.95

8272 **MUSTANG II** 74-76 covers all models $7.95
8187 **NOVA 6** 69-75 covers all 6 cyl models $8.95
0934 **NOVA V8** 69-75 covers all 8-cyl models $8.95
0678 **OLDSMOBILE** covers all models — 55-74 ..... $9.75
0008 **OLDSMOBILE** 75-76 factory manual ... give year $18.95
1724 **OPEL KADETT** 62-73 1000, 1100, 1200 models $9.95

1752 **OPEL KADETT** 67-73 1500, 1700, 1900 mdls $9.95
0859 **OPEL 1900 MANTA** 70-74 covers all coupe mdls $8.95
8459 **OPEL GT** 68-72 covers all 1900cc models $9.95
9589 **OPEL GT** 73 covers all 1900cc models $9.95

9872 **PEUGEOT 304** covers all models — 70-73 ..... $8.95
1546 **PEUGEOT 404** 60-75 covers all models $9.95
0876 **PEUGEOT 504** 68-74 covers all models inc diesel $7.95
8458 **PINTO** 70-72 covers all 1600cc & 2000cc models $6.95
8482 **PINTO** 73 covers all 1600cc & 2000cc engines $6.95
9830 **PINTO** 74-76 covers all models $7.95

1145 **PLYMOUTH** inc Belvedere, Fury, GTX — 55-71 ..... $8.95
0874 **PLYMOUTH** 72-76 Fury, VIP, Gran, Suburban mdls $6.95

0676 **PONTIAC** inc Catalina, 8 ville, Ventura — 55-74 ..... $9.75
1650 **PORSCHE 356** 57-65 covers A, B & C models $9.95
8336 **PORSCHE 911** 64-69 covers all models $9.95
8518 **PORSCHE 911** 64-76 all models except turbo $8.95

1590 **PORSCHE 912** 65-69 with 1582cc engine $9.95
7123 **PORSCHE 914/4** 70-75 1700, 1800, 2000 mdls $8.95
7126 **PORSCHE 914/6** supplement to manual 7123 ..... $3.95
8208 **RAMCHARGER, TRAILDUSTER** 74-75 all models $7.95
8190 **REBEL** 67-70 covers all 6 & V8 models $6.95
0836 **RENAULT 8, 10** 62-72 covers all models $8.95

0645 **RENAULT 15, 17** all TL, TS models — 71-74 ..... $9.95
1554 **RENAULT R16** covers all inc 16TS, 16TL — 65-73 ..... $9.95
0395 **ROADRUNNER & SATELLITE** 68-73 all models $6.95
8650 **ROLLS-ROYCE** Silver Cloud I, II factory manual $54.95
0860 **SAAB 95/96** 66-74 covers all V4 models $8.95
8527 **SAAB 99** 69-76 covers all models inc EMS $8.95

8199 **SUBARU** 70-74 covers all FF, G, GL, DL mdls $7.95
0853 **SUNBEAM ALPINE** 55-56 MK1, 2, 3, 4 & Rapier $8.95
1202 **SUNBEAM ALPINE Mk5** inc Rapier — 65-67 ..... $9.95
0845 **SUNBEAM TIGER** covers all 260 & 289 models $9.95
0489 **TEMPEST, GTO, LE MANS** 68-73 all models $6.95
0006 **THUNDERBIRD** 69-73 factory manual ... give year $14.95

0017 **THUNDERBIRD** 74-76 factory manual ... give year $18.95
0381 **TORINO** 68-72 for all models inc Ranchero $6.95
8189 **TORINO** 73-75 all models inc Ranchero, Elite $6.95
0942 **TOYOTA CARINA** 71-74 covers all models $8.95
0912 **TOYOTA CELICA** 70-74 ST & GT w 8R & 18R-C eng $8.95
0417 **TOYOTA CELICA** 75 covers all models $7.95

7127 **TOYOTA COROLLA** 66-74 covers all models $7.95
7132 **TOYOTA CORONA** 68-74 inc Mark II 4-cyl models $7.95
0754 **TOYOTA CORONA Mk 2** 72-74 for all 6 cyl models $7.95
0681 **TOYOTA HI-LUX** 70-74 for all pick-up models $7.95
0682 **TOYOTA LAND CRUISER** 66-74 covers all models $7.95
0687 **TRIUMPH STAG** 70-74 ..... $9.95

0661 **TRIUMPH SPITFIRE** 62-74 all models Mk I-IV $8.95
1225 **TRIUMPH TR2, TR3, TR3A** — 52-62 ..... $9.95
1231 **TRIUMPH TR4, TR4A** 61-67 covers all models $9.95
0663 **TRIUMPH TR5, TR6** 67-74 all mdls inc TR250 ..... $8.95
8599 **TRIUMPH TR7** $8.95
0662 **TRIUMPH GT6** 66-74 covers all coupe $8.95

0384 **VALIANT** 63-67 covers all models $6.95
8192 **VALIANT** 68-76 all mdls inc Scamp, Signette $6.95
8455 **VEGA** 70-71 covers all models $6.95
0567 **VEGA** 72-73 all 140 CID & GT 140 CID models $6.95
0684 **VEGA** 74-75 covers all 4-cylinder models $7.95
0684 **VEGA** 76-77 covers all models $8.95

0755 **VOLKSWAGEN BEETLE** 54-64 covers all models $8.95
8456 **VOLKSWAGEN BEETLE** 68-70 all models $6.95
0929 **VOLKSWAGEN BEETLE** 71-74 covers all models $8.95
7201 **VOLKSWAGEN BEETLE** 75-76 Super Beetle, K-G $6.95
8067 **VOLKSWAGEN RABBIT, SCIROCCO** 74-75 ..... $7.95
1547 **VOLKSWAGEN BUS** 54-60 Camper, Transporter $8.95

1125 **VOLKSWAGEN** 61-67 camper transporter $8.95
0837 **VOLKSWAGEN** 62-73 Squareback, fastback type 3 1600 ..... $8.95
9639 **VOLKSWAGEN 411** 68-72 411,L,E & LE mdls $7.95
9778 **VOLKSWAGEN 412** all models — 71-73 ..... $7.95
0615 **VOLKSWAGEN DASHER** 74-76 covers all models $7.95
1006 **VOLVO PV444, PV544** covers all models $8.95

1722 **VOLVO 120** 61-70 all mdls inc 122, 123GT, 131 ..... $9.95
8605 **VOLVO 142, 144, 145** 66-70 covers all models $8.95
0932 **VOLVO 142, 144, 145** 71-74 all mdls inc S & E $8.95
8517 **VOLVO 164** 68-75 all models inc fuel injection $8.95
7119 **VOLVO 240** 75-76 all models $7.95
9444 **VOLVO P1800** 60-73 all mdls inc P1800E, ES $9.95

8209 **WINNEBAGO** on 318, 413, 440 cid Dodge chs $7.95

REPAIR & SERVICE MANUALS

8559 **CHILTONS AUTO REPAIR MANUAL** 70-77 all U.S. cars $13.95
8257 **MOTOR'S AUTO REPAIR MANUAL** 71-77 all U.S. cars $13.95
1763 **CHILTON AUTO REPAIR** 54-63 for all American cars $17.95
7106 **CHILTON TRUCK REPAIR MANUAL** 64-74 all ½-2½ ton $17.95
8427 **CHILTON TRUCK & VAN REPAIR MAN.** all 70-76 ..... $17.95
0787 **WIRING DIAGRAM MANUAL** 70-75 all U.S. cars $22.95
8426 **CHILTON AUTO HEAT & A/C MANUAL** all 70-76 ..... $15.95
8496 **AUTO TUNE-UPS FOR BEGINNERS** basic & complete $5.95

8447 **CHILTON BASIC AUTO MAINT** 70-77 U.S. cars $8.95
0579 **FLAT RATE MANUAL** 66-75 U.S. cars for all repairs $14.95
9622 **HOW TO TUNE YOUR CAR** good for all cars $3.95
0981 **BASIC REPAIR & TUNE-UP GUIDE** by Harold Glenn $5.95
1712 **BASIC AUTO REPAIR MANUAL** a must item, Petersen $3.95
1707 **BASIC BODYWORK & PAINTING** $2.95

1711 **BASIC CARBURETORS FUEL SYSTEMS** $2.95
0791 **BASIC ENGINE HOTRODDING** $2.95
1708 **BASIC IGNITION & ELECTRICAL SYSTEMS** $2.95
0580 **BASIC AUTO TROUBLESHOOTING** for all cars $2.95
0629 **BASIC TOOLS** what to buy & how to use it $2.95
8359 **BRAKE SERVICE GUIDE** for repairing all makes $4.95

1161 **ALFA ROMEO 1750/2000** fuel injection manual $4.95
9411 **HOLLEY** carbs, all 2 & 4 bbl, tune & repair $5.95
9652 **ROCHESTER** carbs, all inc 4MV Quadrajet $6.95
9965 **SU, SU-HITACHI** carbs, tuning rebuilding $2.95
9666 **SOLEX** 1 & 2 bbl downdraft, tune & rebuild $2.95
8497 **SOLEX, BRITISH** carbs covers all models 37-74 ..... $6.95

1237 **STROMBERG CD & CDSE** carbs Tune & repair $3.25
9803 **WEBER** carburetors, tuning & rebuilding all $2.95
0682 **FUEL INJECTION MANUAL** all gas & Diesel makes $8.95
8425 **MINOR AUTO BODY REPAIR** step by step how to $4.95
5104 **AUTO BODY REPAIRING & REPAINTING** $6.95
5106 **GLASS FIBER AUTO BODY** construction & repair $3.95

8491 **PRACTICAL ENGINE SWAPPING** how to do it right $5.95
0789 **ENGINE SWAPPING** latest how-to information $2.95
1017 **AUTOMOBILE ENGINE REBUILDING** $12.50
0959 **AUTO RESTORATION GUIDE** biggest ever published $14.95
0525 **AUTOMOBILE RESTORATION GUIDE** for all cars $3.95
0995 **CAR INTERIOR RESTORATION** useful for all cars $3.95

1000 **RESTORATION ANTIQUE & CLASSIC CARS** $9.95
8349 **RESTORATION BOOK**, Petersen's. Very complete $4.95
9419 **SMALL ENGINE SERVICE MANUAL** for all 1 cyl. eng. $7.95
8099 **Super catalog of car parts** — name it; find it $5.95

8233 **ROAD ATLAS** for all states, big cities, Canada, Mexico $3.95
8420 **HOW TO CUT CAR COSTS** buying, fixing, running $4.95

DESIGN & TECHNICAL BOOKS

1257 **INTRODUCTION TO TUNING** how and why $2.50
8474 **BYPASS EMISSION CONTROLS** 71-77 GM cars $8.95
8303 **CHEVY** heavy duty racing parts guide $5.00
8307 **CHEVY 427-510** "Z" engine guide, parts, perf. $5.00
8308 **CHEVY 327-510** engine, racing parts & perf. $5.00
8421 **CHEVROLET RACING ENGINE** how to build $5.95

8301 **CHEVY PERFORMANCE GUIDE** 302 to 496 engs. $5.00
9409 **SMALL BLOCK CHEVYS**, How to hotrod $5.95
1066 **CORVAIR ENGINES**, How to hotrod $5.00
4031 **GUIDE TO CORVETTE SPEED** 53 to 74 tuning $3.95
1256 **TWIN CAM FORDS**, Tuning, Lotus engines $3.95
8298 **FORD PERFORMANCE GUIDE** 289 to 429 engs. $5.00

1645 **FIAT 850** competition tuning manual $3.95
9149 **SUNBEAM TIGER V8**, Tuning $5.00
1003 **TUNING FOR SPEED: TUNING FOR ECONOMY** $9.95
9410 **TURBOCHARGERS**, How to select & install $4.95
5117 **DESIGN & TUNING COMPETITION ENGINES** $12.95
1559 **CYLINDER HEAD MODIFICATION**, theory/practice $4.95

8422 **AUTO AERODYNAMICS** engineering fundamentals $6.95
8481 **BUILDING A RACE CAR** picture by picture $5.95
8480 **HIGH PERFORMANCE WITH FUEL INJECTORS** $5.95
8479 **RACER'S COMPLETE REFERENCE GUIDE** $5.50
8441 **HOW TO MAKE YOUR CAR HANDLE** strt, trk $4.95
8368 **RACE CAR** engineering & mechanics $14.95

0591 **RACING CAR** complete design & development $12.95
9405 **WANKEL ENGINE** most complete book published $14.95
0405 **KARTING** only complete book available $4.95
8215 **CB RADIO OPERATOR'S GUIDE** buy, install $5.95
8216 **CB RADIO INSTALLATION & REPAIR** $5.95
8461 **CONCORDE** supersonic jet design history in color $2.50

8483 **YOU CAN DRAW CARS** an aid to designing cars $3.95

BIG SAVINGS ON CHILTON'S AUTO REPAIR MANUALS

1772 **1965-72** for all U.S. cars ... Reg. $10.95 ..... Only $5.95
1773 **1966-73** for all U.S. cars ... Reg. $10.95 ..... Only $7.95
1775 **1968-75** for all U.S. cars ... Reg. $12.95 ..... Only $8.95
8557 **1968-73** import car manual ... Reg. $18.95 ..... Only $10.95

ROAD & TRACK ROAD TESTS

9674 **CORVETTE** 54-73 16 models tested $4.00
0580 **JAGUAR** 26 models tested — 51-72 ..... $6.50
0581 **MERCEDES-BENZ** 52-73 covers 23 models $5.95
0583 **PORSCHE** 52-75 35 models tested $7.95

VAN & CAMPER BOOKS

8329 **HOW TO CUSTOMIZE CARS & RODS** George Barris $3.95
8337 **ART of CUSTOM PAINTING** for cars, vans & bikes $9.95
8354 **CUSTOMIZING YOUR VAN.** Most complete book yet $3.95
8444 **COMPLETE VAN BOOK** customize it inside/out $5.95
8495 **HOW TO LIVE IN YOUR VAN ... AND LOVE IT** $8.95
8032 **VAN** conversion plans for Ford, Dodge, Chevy vans $9.95

8012 **VW VAN CAMPER** how to convert one $9.95

CAR PRICE GUIDES

0585 **1977 American Cars** inc options & dealer cost $1.95
0586 **1977 Foreign Car Prices** options & dealer costs $1.95
0587 **Used car prices**, American & foreign — 68-74 ..... $1.95
0906 **Old Car Value Guide** latest edit. U.S. & foreign $6.95

DRIVING & RALLYING BOOKS

9414 **DRIVING IN COMPETITION** Tell it as it is $6.95
6316 **SPORTS CAR & COMPETITION DRIVING** $5.95
9476 **How to win at Slaloms & Autocross** $3.95
8482 **AUTO RACE TIMING & SCORING** by J. V. Stropus $3.95

HOME REPAIR GUIDES

0404 **MACHINIST** a complete homestudy course $6.00
8050 **LAWNMOWERS** service and fix all popular makes $4.95
0557 **CHAIN SAW SERVICE MANUAL** for the 24 top makes $7.95
8006 **WASHING MACHINES** how to fix all makes & models $4.95
8049 **TV REPAIRS** how you can do 90% of them yourself $4.95
8047 **ELECTRICAL REPAIRS** fix everything step-by-step $4.95

8049 **DOMESTIC OIL BURNERS**, installation & servicing $9.95
8036 **UPHOLSTERY** complete do-it-yourself course $1.45
8038 **CONCRETE & MASONRY** how to do your own like a pro $4.95
9474 **GLENN'S COMPLETE BICYCLE MANUAL** for all makes $5.95

COMPUTER TECHNOLOGY

9984 **UNDERSTANDING SOLID-STATE ELECTRONICS** $2.95
0997 **HOW A COMPUTER WORKS** covers all aspects $5.95
8451 **COMPUTER PROGRAMMING, SIMPLIFIED** $5.95
8452 **COMPUTER TECHNICIAN'S HANDBOOK** $8.95
8454 **COMPUTER LOGIC, BEGINNER'S GUIDE** $4.95
8381 **COMPUTER PROGRAMMING HANDBOOK** $8.95

Visit our new retail store at 139 E. 47th St., N.Y.C.

E. S. Schechter & Co. 181 Glen Ave., Sea Cliff, N.Y. 11579

BOOK NO.	PRICE		
	$		☐ I enclose full payment D63 Minimum order $5.00
	$		Charge ☐ American Express ☐ BankAmericard — Books shipped to all parts U.S.A. & Canada.
	$		Card number
	$		PLEASE PRINT OR TYPE NAME AND ADDRESS
	$		Name
	$		Address
postage/handling	$ 1	00	City
TOTAL	$		State Zip

SATISFACTION GUARANTEED OR YOUR MONEY BACK

Send orders to E. S. Schechter & Co., 181 Glen Ave., Sea Cliff, N.Y. 11579

Материал, защищенный авторским правом

Make rustic picture frames from barn siding

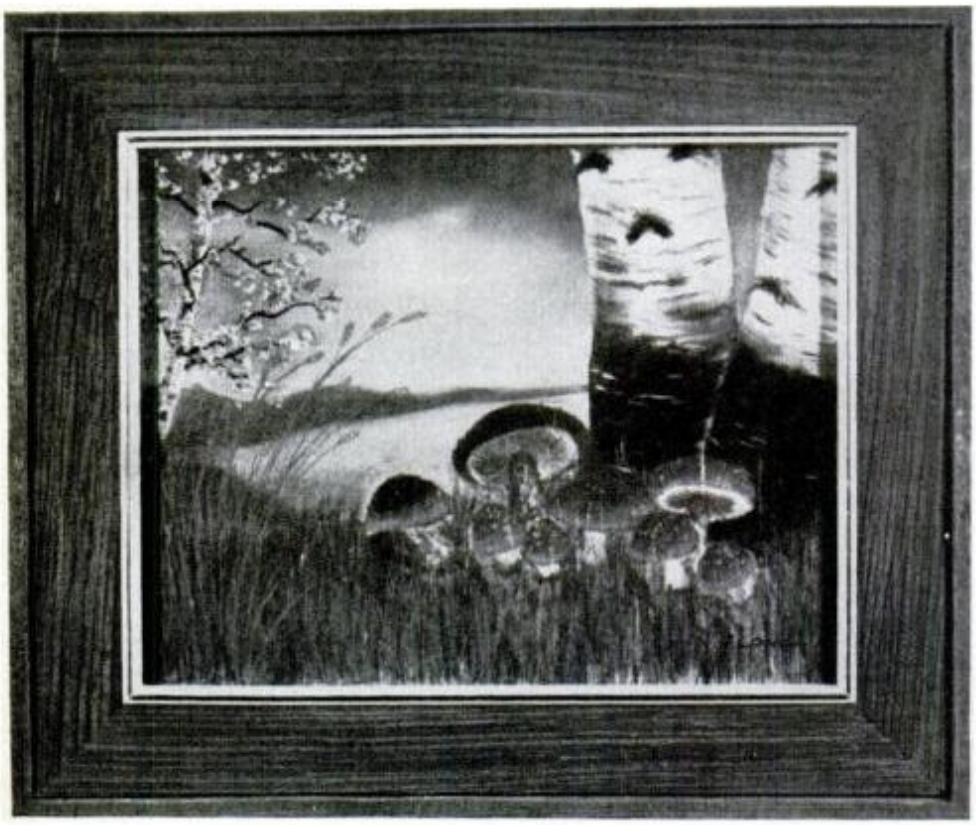
by James A. Long

An old abandoned and weather-beaten farm building may be an eyesore to the countryside, but the boards in it are as good as gold. Weathered barn siding has become a popular and much-sought lumber for remodeling. I find the wood particularly appropriate for framing wildlife prints, nature paintings and landscapes. Its rustic look adds charm to the picture.

A few pieces of this rough-textured wood can usually be had for little or nothing. The thing to remember when you spot a weathered old building on its last legs is that it still belongs to someone and you should not just stop and help yourself. Get the owner's permission to remove a few boards. Probably he will be glad to get rid of them. Pick relatively straight boards and don't worry about nail holes—they add to the overall rustic look. If the boards are wet, they will have to be air-dried for a few days, maybe longer.

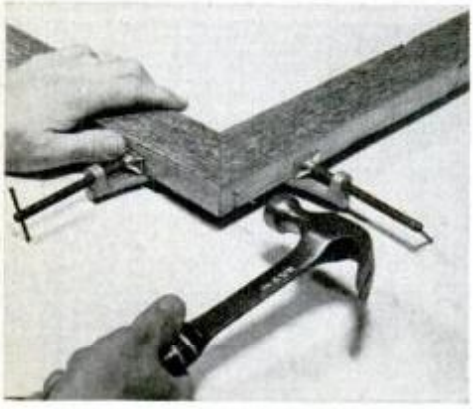
I have made some handsome picture frames from old weathered barn boards. You'll need a miterbox and four picture-frame corner clamps. A table saw makes it easy to run the bead on the inner molding. Follow the steps below and on page 186 and you'll wind up with a beautiful frame that is a part of the picture. ★★★

(More photos on page 186)

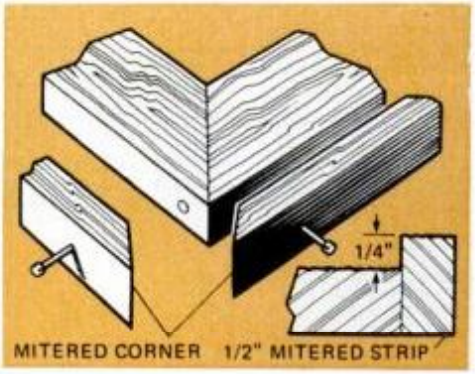


Weathered barn siding makes the perfect frame for a nature painting, as shown at the left. Outer edges of frame are distressed by gouging wood here and there with a sharp knife.

After cleaning, rip boards 2 or 3 in. wide. Lay out picture size on paper, allowing ⅛ in. all around; miter main frame members to fit. Double check size. Butter mitered ends with white glue.



Pull mitered ends together with two-way picture-frame clamps and nail corners while the members are clamped together.

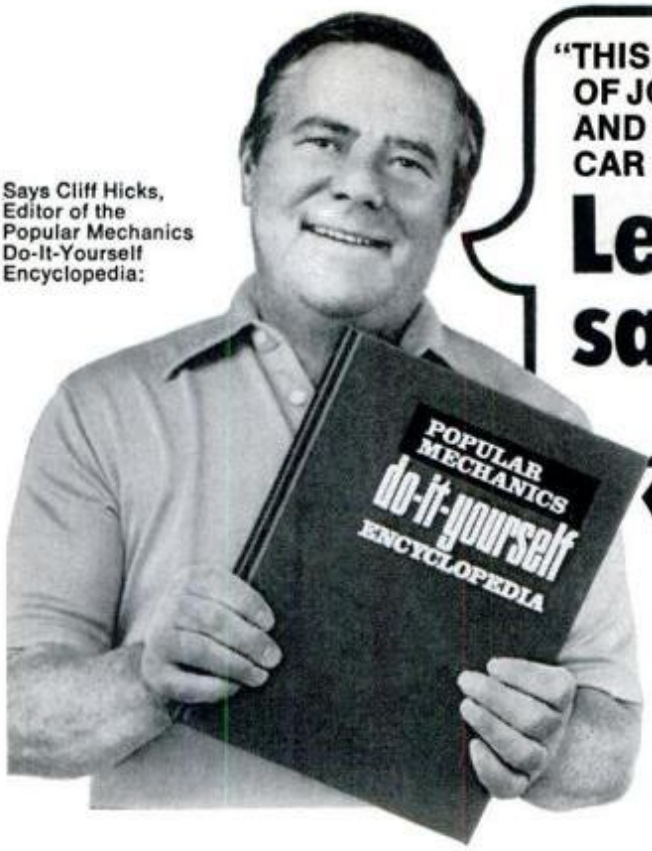


Rip ½ x 1-in. strips, miter ends and nail to outer edges of main frame. Gouge saw-cut edges here and there with knife.

Add to weather-beaten look of the frame by applying a light gray semitransparent shingle stain. Brush with the grain.

Материал, защищенный авторским правом

Says Cliff Hicks, Editor of the Popular Mechanics Do-It-Yourself Encyclopedia:



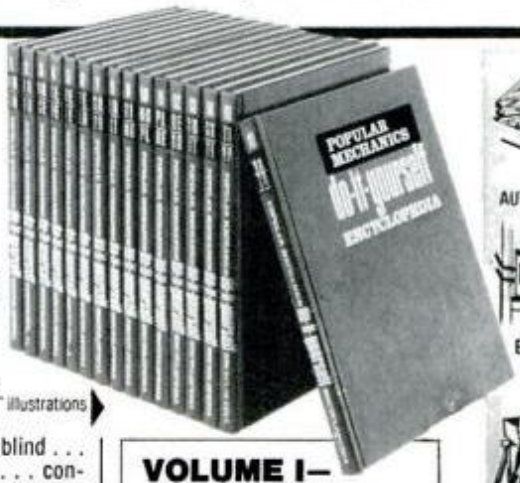
"THIS SET OF BOOKS CAN HELP YOU DO HUNDREDS OF JOBS AND PROJECTS WITH YOUR HANDS — AND SAVE A BUNDLE OF MONEY ON HOME AND CAR REPAIRS AND IMPROVEMENTS.

Let me send you a sample volume FREE

with a cancel-anytime subscription to the set"

196 pages
- 8¼" x 11"
- Over 600 how-to-do-it illustrations
- Stain-and-scuff resistant washable binding
- Opens flat for workbench use
- Big, easy-to-read type

Sixteen 8¼" x 11" Volumes — 3,136 pages — Over 10,000 "show – how" illustrations



Why this invitation from Cliff Hicks? To introduce you to a remarkable set of books for the home handyman, craftsman, hobbyist and sportsman — the POPULAR MECHANICS DO-IT-YOURSELF ENCYCLOPEDIA.

The Do-It-Yourself Encyclopedia is a profusely illustrated, 16-volume reference library chockfull of step-by-step "how to do it" ideas, plans, projects and shopping tips to save you money. And Volume I of the set is yours absolutely free with this offer.

We will send you this Free volume — and future volumes for Free Trial — so you can see for yourself, without risk, just how valuable and useful the Do-It-Yourself Encyclopedia can be.

Your Free Volume I alone gives you a wealth of valuable information to help you repair auto bodies . . . antique furniture . . . squeeze a bedroom into a "tight" attic space . . . buy and troubleshoot home appliances . make musical instruments . . . make unusual models . . . fix a leaky basement . . . and more. And Volume I is just the beginning. You can readily imagine the benefits of having the entire Encyclopedia.

Save hundreds of dollars on repairs and home improvements

Stop throwing away hard-earned cash unnecessarily on electricians, painters, plumbers, who charge $10 . . . $12 . . . even $14 an hour.

You can use this 16-volume Encyclopedia to lay a slate entryway . . . build a desk . . . construct a barbecue . . . make a runabout boat . . . build a whole new garage — for a fraction of what you'd spend to have others do these jobs for you. And that's only the beginning!

Easy-to-follow instructions bring you a wealth of exciting hobby and craft ideas.

Whether you're handy with tools or not so handy, this set is for you. Step-by-step, clearly illustrated instructions show you how to make furniture, toys, games; solve plumbing problems; do wiring, auto and appliance repair. You'll not only save labor costs — you'll learn how to get good buys in materials and appliances . . . learn what to look for in buying a house . . . learn of tests you should make in the store **before** you buy an air-conditioner . . . binoculars . . . a rotary mower . . . a used camera.

You'll get expert guidance in skills that can help you earn spare-time income . . . become a better home gardener . . . build a duck blind . . . remodel with drywall . . . add a patio . . . construct dormers . . . much, much more. It's like having hundreds of professional craftsmen at your elbow advising you.

Turn to any of the 16 volumes in this remarkable 3,136-page Encyclopedia, and you'll discover new ways for you and your family to get more fun out of life . . . to live **better** for **less** money . . . to know the deep sense of accomplishment and self-reliance that come from being able to **do it yourselves.**

Want to solve common car ailments? Install a burglar alarm? Build a fun kind of boat? Build a band grinder or band sander? You can discover how to do all this — and much more — in your FREE Volume I alone.

Send for your **Free** first volume now. Thumb through it, try out a plan or project, use it at your workbench. Imagine 16 such magnificent volumes side by side, offering you **money-saving** tips . . . **labor-saving** information . . . **time-saving** advice . . . plus annual supplements that keep your know-how on new tools, materials and home improvement techniques up to date.

Decide — only after you have seen your **Free** Volume I — whether you wish to continue receiving additional volumes of the set as described on the order form. Each volume is sent **on approval** — there's no obligation to buy **any** at all. Keep only those you want to keep — cancel whenever you wish. Whatever you decide, Volume I is **yours to keep Free.** Don't delay — send for your **Free** Volume I today.

VOLUME I— A $4.95 VALUE— YOURS FREE

A few of the subjects covered by more than 6,000 index entries—projects, plans and ideas for better living.

APPLIANCES — Money-saving fix-it instructions
ATTICS — Get more use from available space
BASEMENTS — Waterproofing; finishing tips, etc.
BATHROOMS — Remodeling ideas
BEDROOMS — Built-ins, other spacesavers
BOATS — Plans for exciting boat designs
CAR REPAIR — A wealth of "show-how" illustrations
CONCRETE — The ABCs of good concrete
ELECTRIC WIRING — Basics of home wiring
GARAGES — Step-by-step plans for garage with patio
GARDENING — Gardening tips; how to build equipment
HOME MAINTENANCE — Tested how-to features
KITCHENS — Space and time savers
LANDSCAPING — Walls, patios, site planning
LAWNS — Seed, fertilizer, weed and disease control
LUMBER — Basic data every craftsman should have
MOVIES — Add a soundtrack; also, make titles
PHOTOGRAPHY — Picture-taking, darkroom techniques
POWER TOOLS — Ways to get more out of your workshop
PLUMBING — Understanding your home system
RECORD CHANGERS — Trouble-shooting
REFINISHING — How to get results you want
ROOFS — Important things you should know
SHELTERS — Protection for boats, mowers, etc.
STAIRS — Secrets of expert stair construction
SWIMMING POOLS — How to build with concrete blocks or fiberglass
TOYS — Powered toys, action toys, dollhouses
USED CARS — How to recondition
WOODWORKING — Use methods the experts use

...AND EVER SO MUCH MORE!

POPULAR MECHANICS BOOKS, Box 2315, F.D.R. Station, New York, N.Y. 10022

This certificate entitles you to a free gift — Vol. 1 of the 16-vol. Popular Mechanics Do-It-Yourself Encyclopedia, with no obligation to buy anything ever.

As a subscriber in good standing, you'll enjoy free examination of the additional volumes as you receive them. In about 6 weeks we'll send you Vol. 2, and 4 weeks later Vol. 3. After that, at approximately monthly intervals, we'll send you shipments of Vols. 4-6, 7-9, and 10-16. This way you'll be able to complete the set in 6 months. Also, you'll receive annual supplementary volumes as they are published on free 14-day approval with no purchase obligation. You may cancel at any time or return any volume within 14 days for full credit and no more will be sent. Take as many volumes as you like — or none at all. For each volume you keep, you'll be billed just $4.95 plus postage and handling. But you need never pay for more than 1 volume per month no matter how many you have received.

Name _____ (PLEASE PRINT)

Address _____

City _____

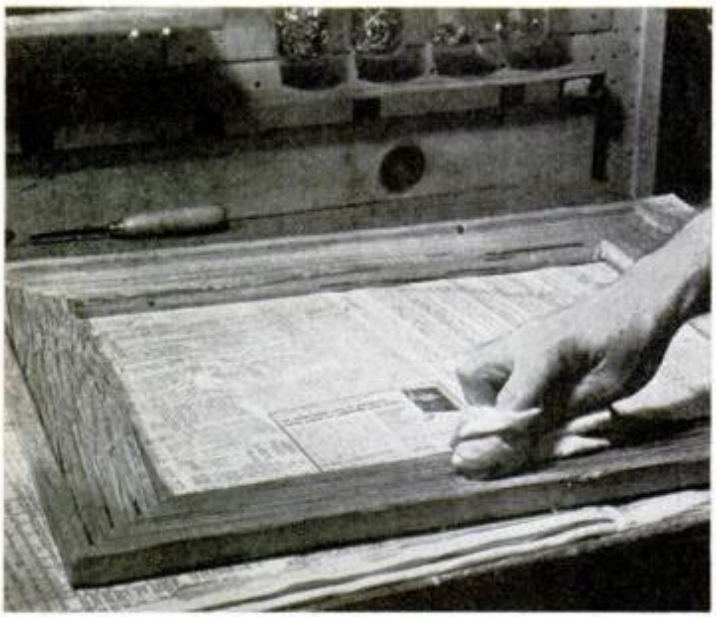
State _____ Zip _____

Signature _____

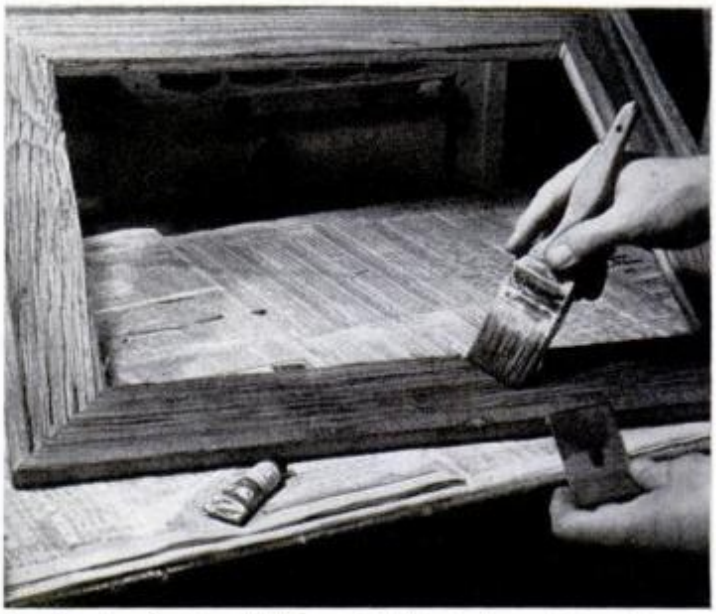
This certificate subject to acceptance by the publisher. R304

MAKE RUSTIC PICTURE FRAMES FROM BARN SIDING

(Continued from page 184)



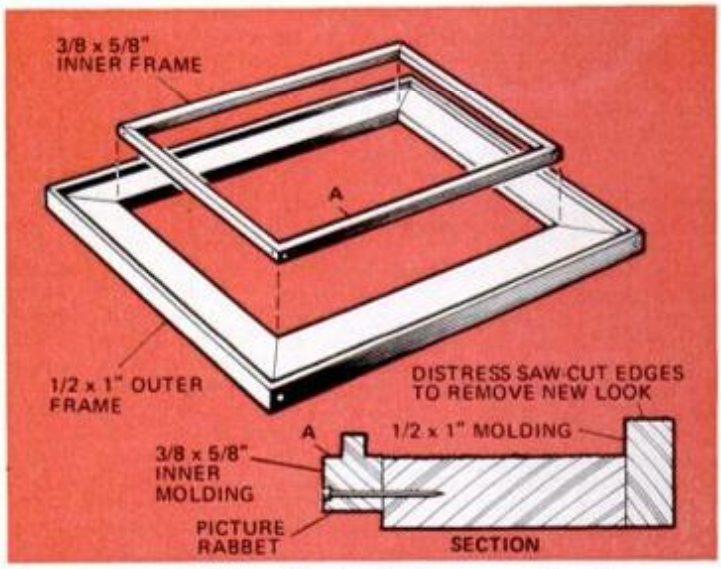
Wipe most of the stain from the wood with a coarse cloth, then while the stain is still wet, brush lightly and evenly with oil colors that accent the colors in the picture.



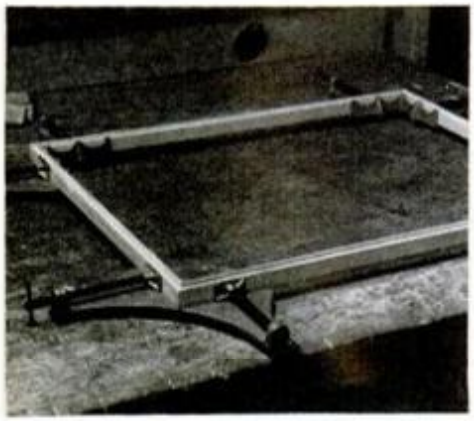
Use burnt umber for rich brown tint, burnt sienna followed by a touch of yellow ochre here and there for a warm brown look. Experiment on scrap piece of wood first.

Rip ⅜ x ⅝-in. molding to shape shown for adding to inside of main frame from scrap stock. Sand the wood and miter the ends for an exact inside fit. Molding forms rabbet for glass.

Picture-mounting trick: When covering the back of the frame with brown wrapping paper, dampen paper first. Then apply glue to frame and lay dampened paper in it. When paper dries, it will shrink smooth and tight. Use screw eyes to attach picture wire to back, placing eyes about quarter way down from the top.



Inner frame adds decorative touch, also forms rabbet for picture and glass. Keep shoulders of top bead on molding even with the textured surface of the main frame.



Glue and clamp inner molding together as a separate frame, using your picture-frame clamps to hold the four corners.

Give inner frame two or more coats of a heavy white acrylic paint called gesso. You can buy it in an art store.

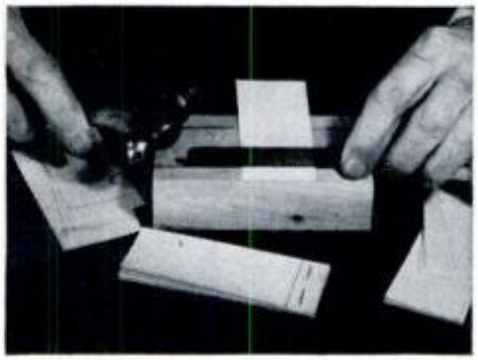
When gesso is dry, paint top bead with two coats of gold paint. Finally insert frame inside the main frame and nail.

Материал, защищенный авторским правом

HINTS

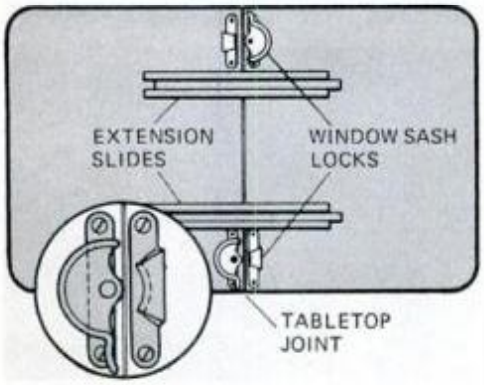
FROM READERS

Saw blade perforator



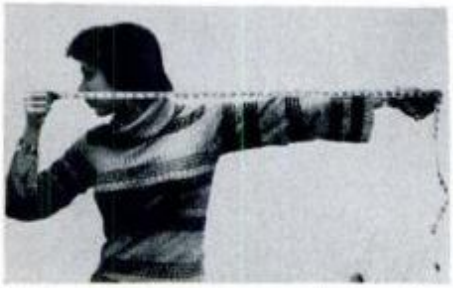
An old hacksaw blade makes a good perforating tool. Grind both sides of its teeth to form sharp projections. Then use it to perforate a notebook for easy page removal by tapping the blade with a hammer.
—*Walter E. Burton*

Tabletop lock



Tabletop halves that tend to separate can be fastened to make a tight joint. Attach window sash locks at each end of the joint. Allow about ⅜ in. between the lock parts for the table to be joined tightly when the lock is fastened.—*C.J. Tate*

Meter measurer



If a yard is about the distance from your nose when you face forward to the fingertips of your outstretched arm, then a meter is from nose to fingers when your head is turned away from this arm.—*H.J. Miller*

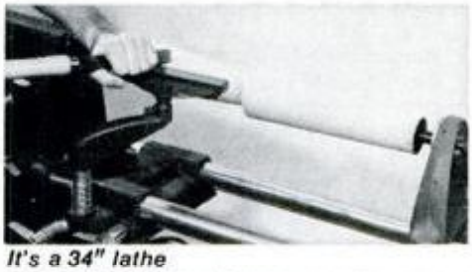
YOU CAN CREATE FINE WOOD PROJECTS

☐ Make your own furniture
☐ Add an extra room
☐ Build a part time business

SHOPSMITH

5 in 1 Power Woodworking Tool

Saves big money and saves space. With one multipurpose tool you can do most all workshop operations. Saves hundreds of dollars over the cost of separate power tools. Learn how you can use Shopsmith as the craftsmen do, for more accurate and faster fine cabinetry, carpentry and furniture work.

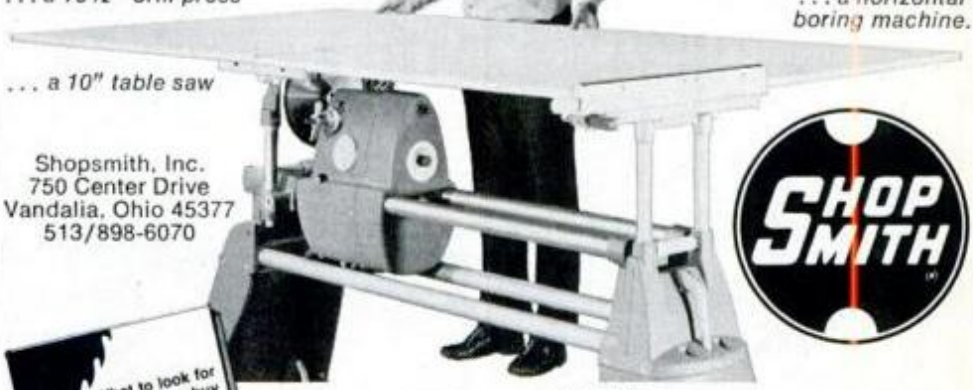


It's a 34" lathe

. . . a 12" disc sander

. . . a 16½" drill press

. . . a horizontal boring machine.



. . . a 10" table saw

Shopsmith, Inc.
750 Center Drive
Vandalia, Ohio 45377
513/898-6070

SHOP SMITH

For more information and a **FREE** book that can help save you over $1,000 on a complete woodworking shop, fill out the coupon and mail today. Absolutely no obligation of any kind. No salesman will call.

Shopsmith, Inc., 750 Center Drive, Vandalia, Ohio 45377

☐ **YES!** Please send FREE copy of "What to look for when you buy power tools" and details on the Shopsmith Mark V. I understand there is no obligation.

Dept. 1506

Name _____

Address _____

City _____ State _____ Zip _____

NOW COMES IN 2 SIZES:
PONY FOR SMALL GARDENS,
HORSE FOR LARGE GARDENS.

JUST ONE HAND!

So easy to handle you guide it with just one hand. And now the Troy-Bilt Roto Tiller-Power Composter is yours in 14½" and 20" tilling widths. For complete details, prices, off-season discounts, send coupon below for free booklet.

Troy-Bilt, 102nd St. & 9th Ave., Troy, N.Y. 12180

Troy-Bilt Roto Tiller-Power Composters, Dept. 70192
102nd St. & 9th Ave., Troy, N.Y. 12180

Please send the whole exciting story of Troy-Bilt® Roto Tiller-Power Composters, including prices, specifications and off-season savings.

Mr. (Please Print Clearly)
Mrs.
Miss _____

Address _____

City _____ State _____ Zip _____

LEARN Coleman CAMP GEAR REPAIR

MODERN SCHOOLS
Dept. No. PMC
4225 North Brown Avenue
Scottsdale, Arizona 85251

LANTERNS
STOVES
HEATERS
COOLERS
(All Models)
TENTS
CONVERSIONS
BACK PACKS

25,000 students since 1946

WOOD-SPLITTING MAUL

MAKES SHORT WORK OF THAT WOOD PILE

20 LB. HARDENED TOOL STEEL HEAD WITH STEEL HANDLE UNCONDITIONALLY GUARANTEED FOR AS LONG AS YOU LIVE. ONE BLOW USUALLY DOES IT. TOOL SELDOM STICKS. ENDS BROKEN HANDLES, STUCK HEADS ON AXES OR LIGHTWEIGHT MAULS. FORGET ABOUT STUCK, FLYING OR LOST WEDGES. A SUPER TOOL FOR ONLY $15.70 PLUS SHIPPING. $3.25 EAST AND $5.50 WEST OF THE MISSISSIPPI. FREE INFO ABOUT MORE WOOD HEATING AND COOKING PRODUCTS.

SOTZ CORPORATION
COLUMBIA STA., O. 44028

PRESCRIPTION EYEGLASSES BY MAIL

From $14.95

Frames, Lenses & Case...Complete

Your own doctor's prescription will be filled, or your present lenses duplicated.

Large selection of the latest fashion frames. All types of lenses available. Quality, accuracy, fit guaranteed.

SEND FOR **FREE** FAMILY CATALOG TODAY!

PRISM OPTICAL INC. Est. 1959
Dept. M-27, 10992 NW 7th Ave, No. Miami, Fla. 33168

Now, you can split firewood simply with this hydraulically operated log splitter. Featured in our October issue, this popular item will split 2 ft lengths of maple and ash logs 12 to 14 inches in diameter.

WANT TO DO IT THE EASY WAY?

Plans with full instructions show how to build the splitter step by step.

You can do it the easy way . . . and enjoy that fire while you're saving money.

PM Plans Library Dept. LS
Box 1014, Radio City Station, New York, N.Y. 10019

Please send complete plans & instructions.
I enclose a check or money order for $8.95

Name _____

Address _____

City _____ State _____ Zip _____

Please allow 3-4 weeks for delivery.

Be a Marine Mechanic ...in 90 Days

AMERICAN MARINE INSTITUTE
1445 Skytrooper Rd., Daytona Beach, Fla. 32015
Phone Toll Free 800-874-0645

Name _____ Age _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____ 77-2-31

ROTO STRIPPER
Powers Paint Off

Patented "whipping action" makes short work of paint, scale, rust. Solid steel lifetime tool only $12.95 + $1 postage. Specify FINE for furniture, COARSE for big jobs.

STURGES, 47 Riverside, Westport, CT 06880

RV SERVICE, REPAIR

QUALIFIED MEN URGENTLY NEEDED! RV owners know how hard they are to find. High salaries, huge profits can be yours . . . or just fix your own. Complete, illus., 16-unit course lets you learn at home — quickly, easily. FREE INFORMATION.

RV SERVICE TRAINING, Dept. 4
5015 N. Darfield, Covina, CA 91724 No obligation

Be a VETERINARY ASSISTANT

...Lab Aide, Zookeeper, Pet Shop or Kennel Owner
MEN - WOMEN! Train at Home in Spare Time . . .
Rush free facts how I can train at home to be an animal care specialist for only a few dollars a month. No salesman will call.

Name _____ Age _____
Address _____
City _____ State _____ Zip _____

Careers by Home-Study | North American School of Animal Sciences, Dept. PB017
4500 Campus Dr., Newport Beach, CA 92663

Complete Catalog $1

For TOOLMAKERS who use the FINEST . . . . .

GERSTNER TOOL CHESTS
Dept. B7, 20 Cincinnati Street
Dayton, Ohio 45407

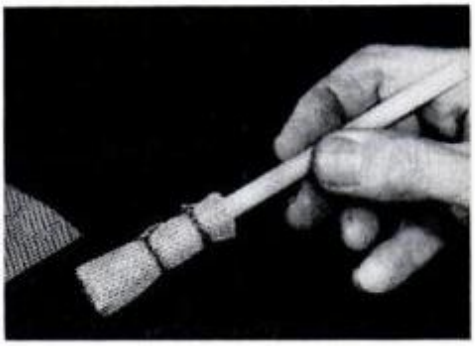
HINTS

FROM READERS

Nozzle substitute

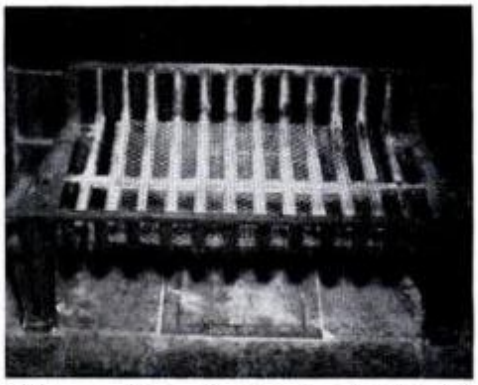
Many spray-can nozzles can be interchanged. So save them after a can has been used for replacing plugged or defective nozzles.—*H. Wheeler*

Brushes from screening



Convert wire screening remnants to brushes by wrapping them around a wooden dowel and binding with wire. They clean files and rasps and remove rust.—*Walter E. Burton*

Enjoy a longer-lasting fire



Place a strip of wire mesh with ¼ to ½-in. squares in your fireplace grate to retain large pieces of half-burned ash that would otherwise fall through the grate.—*Russ Dixon*

Материал, защищенный авторским правом

Unique full-function 8-digit wrist calculator... available only as a kit.

A wrist calculator is the ultimate in common-sense portable calculating power. Even a pocket calculator goes where your pocket goes—take your jacket off, and you're lost!

But a wrist-calculator is only worth having if it offers a genuinely comprehensive range of functions, with a full-size 8-digit display.

This one does. What's more, because it *is* a kit, supplied *direct* from the manufacturer, it costs only a very reasonable $19.95. And for that, you get not only a high-calibre calculator, but the fascination of building it yourself.

How to make 10 keys do the work of 27

The Sinclair Instrument wrist calculator offers the full range of arithmetic functions. It uses normal algebraic logic ('enter it as you write it'). But in addition, it offers a % key; plus the convenience functions $\sqrt{x}$, $1/x$, x^2; plus a full *5-function memory*.

All this, from just 10 keys! The secret? An ingenious, simple three-position switch. It works like this.

1. The switch in its normal, central position. With the switch centered, numbers—which make up the vast majority of key-strokes—are tapped in the normal way.

2. Hold the switch to the left to use the functions to the left above the keys...

3. and hold it to the right to use the functions to the right above the keys.

The display uses 8 full-size red LED digits, and the calculator runs on readily-available hearing-aid batteries to give weeks of normal use.

Assembling the Sinclair Instrument wrist calculator

The wrist calculator kit comes to you complete and ready for assembly. All you need is a reasonable degree of skill with a fine-point soldering iron. It takes about three hours to assemble. If anything goes wrong, Sinclair Instrument will replace any damaged components *free*: we want you to enjoy assembling the kit, and to end up with a valuable and useful calculator.

Contents

Case and display window.
Strap.
Printed circuit board.
Switches.
Special direct-drive chip (no interface chip needed).
Display.
Batteries.

Everything is packaged in a neat plastic box, and accompanied by full instructions. The only thing you need is a fine-point soldering iron.

All components are fully guaranteed, and any which are damaged during assembly will be replaced free.

The wrist-calculator kit is available only direct from Sinclair Instrument. Take advantage of this 10 day money-back offer.

Send the coupon today.

Sinclair Instruments Inc.
6 Commercial Street
Hicksville, N.Y. 11801

PM-2

To: Sinclair Instruments Inc.
6 Commercial Street
Hicksville, NY 11801

Please send me

_____ Sinclair wrist calculator kit(s) at 19.95_____

Sales tax (NY residents) _____

Shipping & handling ($2.50 per unit) _____

Enclosed is check/MO (payable to Sinclair Instruments Inc.) TOTAL $_____

Name _____

Address _____

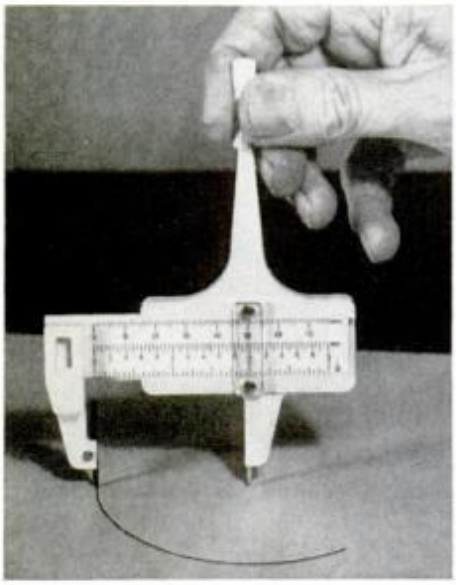
City _____

State _____ Zip _____

I understand that you will refund the purchase price of the kit in full if I return it in saleable condition within 10 days of receipt.

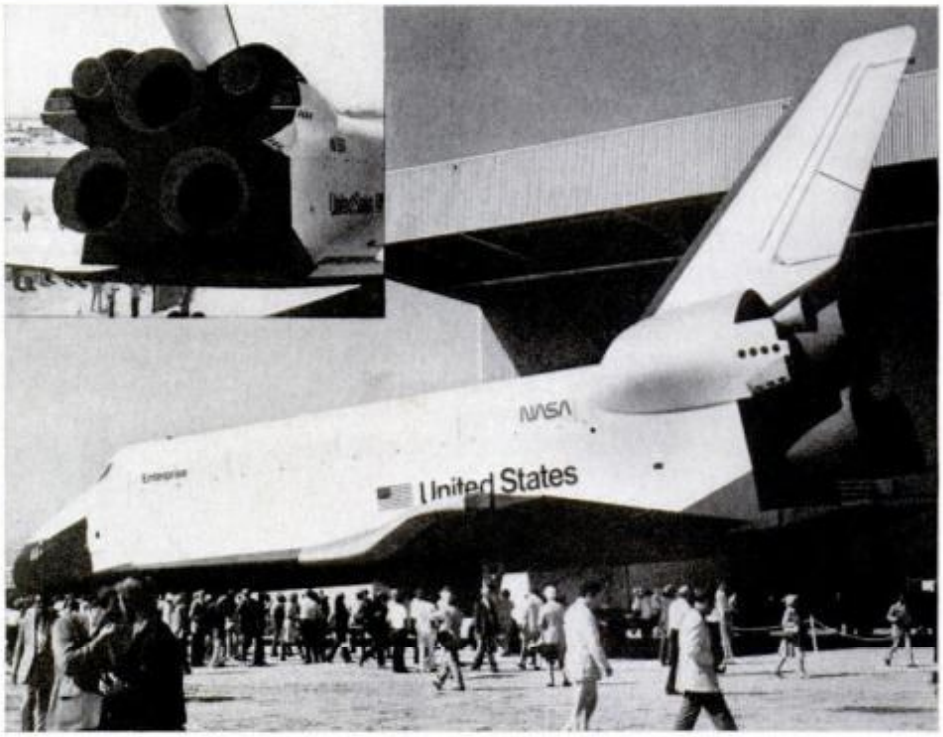
Материал, защищенный авторским правом

IT'S NEW NOW



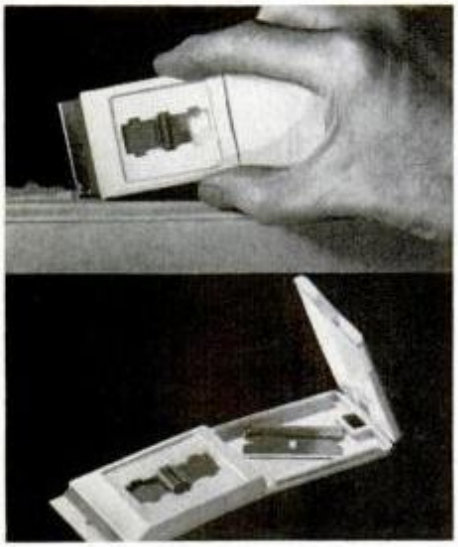
Calibrated supercompass

Circles up to 6 inches, accurate to .005 inch, are easy with "Slidecomp," a compass calibrated in fractional millimeters, inches and decimals. $6.73 postpaid, Stock Sales, Box 606, Mineola, N.Y. 11501.



Space Shuttle Orbiter 'Enterprise' gets ready

NASA's new workhorse spacecraft, dubbed "Enterprise" after TV's "Star Trek" ship, is built and being readied for flights starting July 1980. The 122-foot-long, 57-foot-high "returnable" orbiter will deploy satellites, space labs and interplanetary probes, and also service orbiting satellites. Her engines (inset) each produce 375,000 pounds of thrust at sea level, 470,000 in space.



Un-painter for window panes

Removing dried paint from windows after doing the trim can take longer than the painting. Now Red Devil, Inc., has a molded-plastic scraper with a three-position retractable razor-blade working edge that it claims makes the job easier. The slanting contour handle is what turns the trick (top, above). A snap-open compartment inside the handle stores spare blades. Tool, with three blades, costs about $1 at most hardware, paint and department stores.

Pool for upstream swimmers

Is swimming too easy? Try a "Hydroswim" pool. It has three water jets at one end, enabling users to swim against a current. The jets adjust to conform to your skill, stroke or style. Since the water can move at a swimmer's top speed, you don't go anywhere. Hence, pool's overall size (8 x 12 feet and 44 inches high) is more than adequate. It's made of 3/16-inch aluminum and comes with sealants, filter, skimmer, pumps and all required hardware and fittings. Hydroswim, 1216 S.W. Sixth Ave., Ocala, Fla. 32670.

Instant splint

Inflatable nylon fabric bags come in the shape of a glove, boot or general wrap to cover and compress most any type of bone break, sprain or injury. The "gas bag" splints are then inflated from a can of Cryogen, immobilizing and cooling the injured area to 36° F. The cold compress not only holds the injured area rigid at a constant .6 p.s.i., but also performs a cryotherapeutic function, reducing swelling and relieving pain. Automatic pressure regulation prevents overinflation, and temperature is held to ±1° F. Cryomed Devices, Inc., 14 Farber Rd., Princeton, N.J. 08540.

Материал, защищенный авторским правом

SAVE YOUR BACK AND SAVE SOME MONEY, TOO...

as you split firewood the easy way with POPULAR MECHANICS great new log splitter. You build it yourself and then sit back to reap the rewards of a roaring fire. The rig on this hydraulically operated log splitter exerts some 10,000 lbs. of pressure and will easily split 2 ft lengths of maple and ash logs 12 to 14 inches in diameter. With an I-beam backbone, double acting hydraulic cylinder, control valve oil filter, 3 hp gasoline engine and more features, you'll find this log splitter a delight to build and a pleasure to use. And, you'll save your back from aching as well as saving money by splitting that wood yourself. So, have some more time to enjoy the warmth from your fireplace. Send for complete plans and step by step instructions now. Just $8.95

PM Plans Library **Log Splitter**
Box 1014, Radio City Station N.Y., N.Y. 10019
Please send complete plans and instructions. I enclose a check or m.o. for $8.95. Make checks payable to Popular Mechanics.

Name _____

Address _____

City _____ State _____ Zip _____

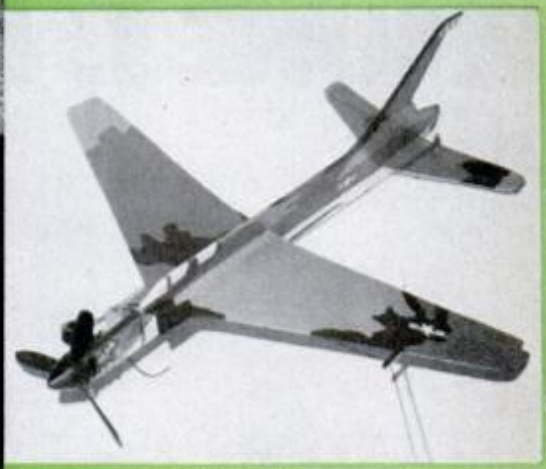
Please allow 3-4 weeks for delivery. PM277

Материал, защищенный авторским правом

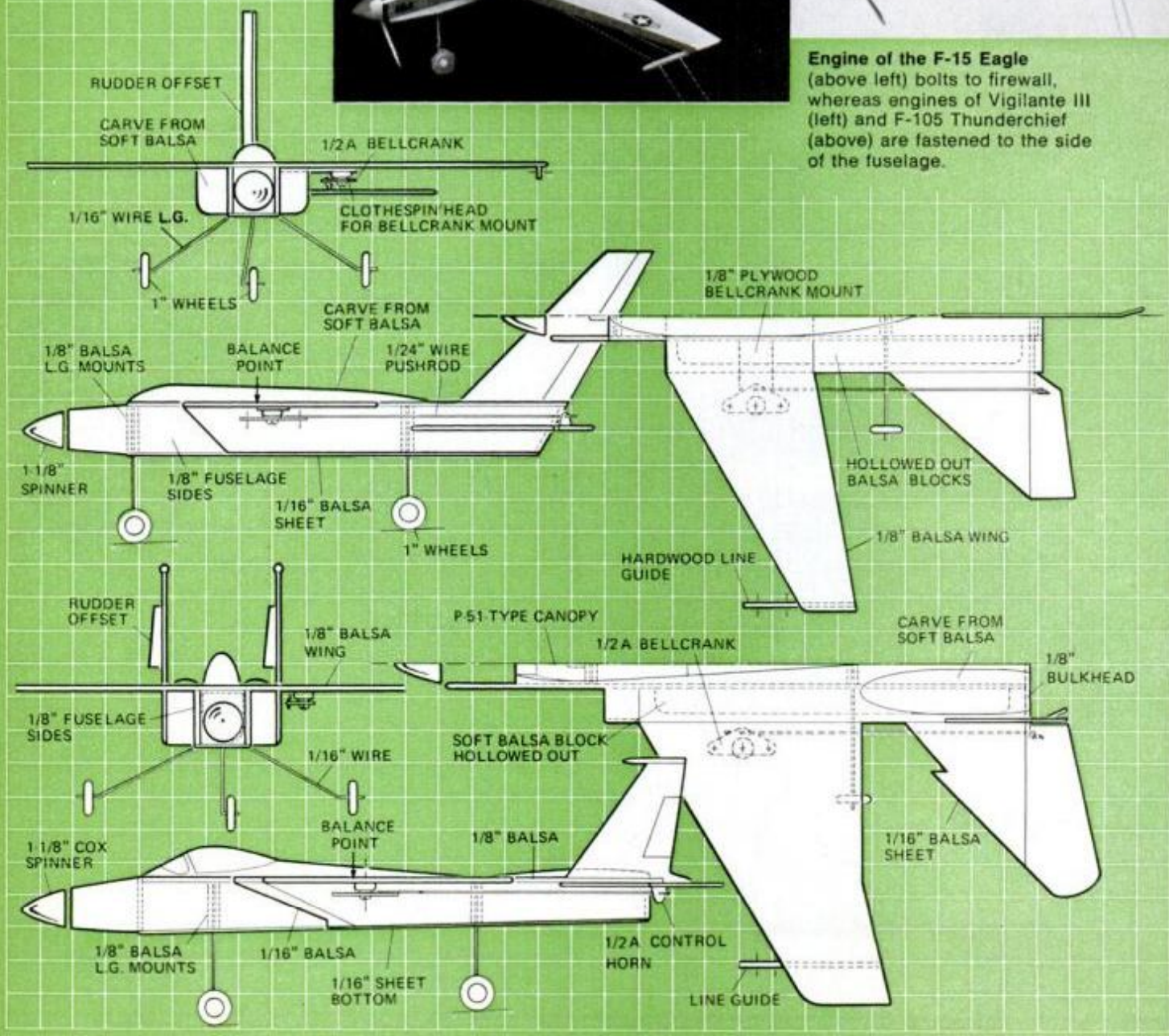
3 control-

Scratch-built planes can use engines retrieved from crashes.

by Fred L. Wolff



Engine of the F-15 Eagle (above left) bolts to firewall, whereas engines of Vigilante III (left) and F-105 Thunderchief (above) are fastened to the side of the fuselage.



line fighters to make

If you have a perfectly good model engine salvaged from the crash of a ready-to-fly plastic job, you can put it to work again powering one of these three easy-to-build control-line models made of balsa. Components such as bellcranks, elevator horns, wheels, tanks, lines and the like, are inexpensive and available at any hobby shop.

Vigilente III

Building the Vigilente III is relatively simple. After studying the plans, shape and sand the fuselage sides from 1/8-in. balsa. Cut the plywood firewall and the balsa rear bulkhead and cement them to the fuselage sides with epoxy. Bend the landing gear from 1/16-in. wire, apply epoxy and sandwich the gear between the landing-gear mounts. Clamp in a vise until dry and epoxy to the fuselage. Next, shape, sand and hollow out the fuselage side blocks (1 x 1½ x 12 in.) and cement in place.

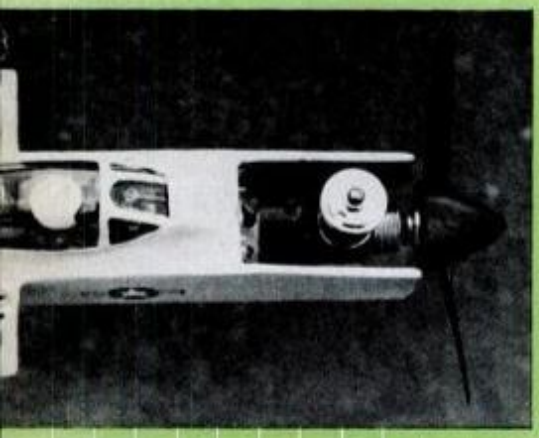
Cut the bellcrank platform from 1/8-in. plywood, epoxy the hardwood bellcrank to it (the top of a clothespin can be used for a mount) and attach the bellcrank with a screw.

Cement the wing in place, add the fuselage top sheeting and then the horizontal stabilizers. The elevators are connected with a 1/8-in. dowel and attached to the stabilizers with cloth hinges. Before hinging, epoxy the control horn to the left elevator. Attach the wire pushrod to the bellcrank and horn, cement the vertical stabilizer in place, offsetting the rudder as shown, and epoxy the hardwood line guide.

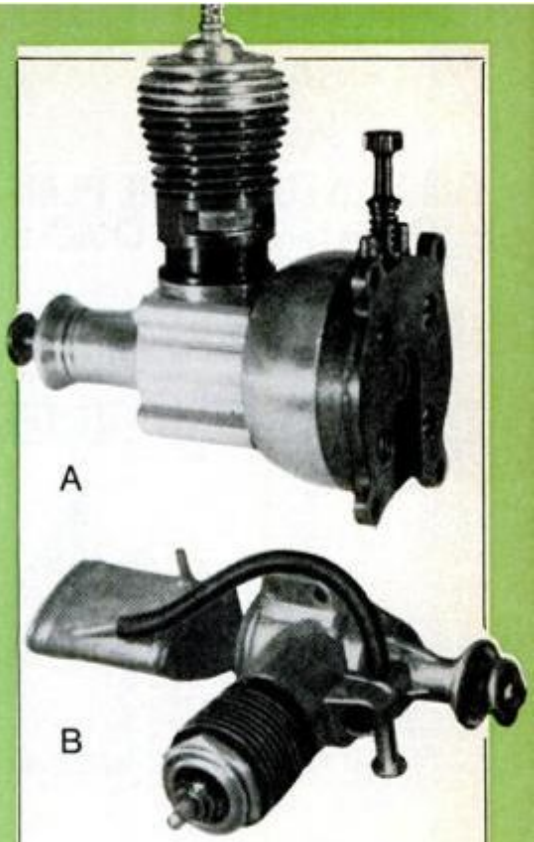
After shaping and gluing together the cockpit canopy from four pieces of 1/8-in. balsa, glue it to the top of the fuselage. All that remains is to add the wheels which are held in place by collars and washers, and the engine which is attached to the firewall with four small screws.

Before cementing the wing and the horizontal and vertical stabilizers in

(Please turn to page 194)



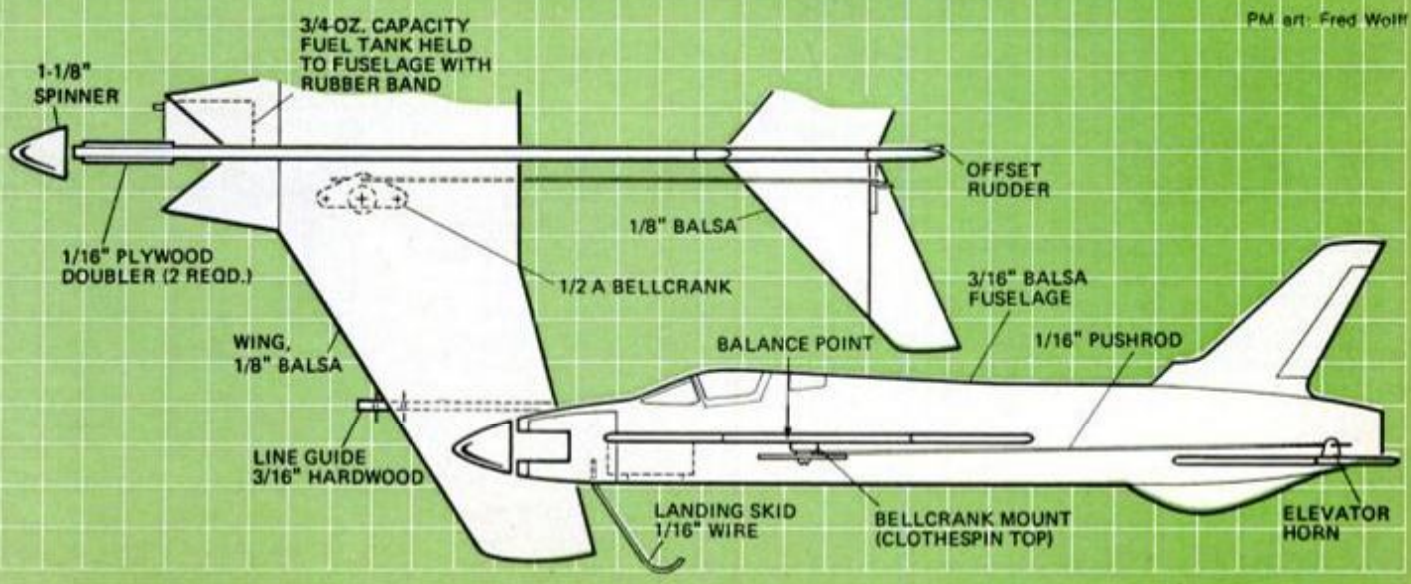
Engine with built-in fuel system (left) is mounted to firewall. Engine with separate fuel tank, rubber-banded to fuselage, bolts to side of profile-type fuselage.



ENGINES

Most small engines used to power ready-to-fly models can be easily adapted to homebuilt designs without modification. In some cases, flywheels must be removed and a new propeller added. Engines that have built-in fuel tanks (A) can be mounted directly to the firewall. Others require separate fuel tanks connected with small tubing to the needle-valve assembly (B). Here, the fuel tank is mounted behind the engine so the fuel outlet is level with engine's needle valve and fuel has a direct path to the engine. Most current engines utilize miniature "glo plugs" for ignition which require a 1½-v. battery to start. Once the engine is running, combustion heat keeps the plug's coil glowing and the battery connections can be removed. Care should be taken to keep vent, filler lines and air intakes unobstructed, and needle valves in the open for adjustment.

PM art: Fred Wolff



BARGAIN HUNTER

Full-Size FURNITURE PLAN
18th Century PINE CRADLE

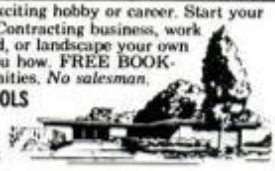
Authentic 18th century design. All joints hand-pegged like the original 36" long, 29¼" high. Perfect for fireplace wood, magazines. Baby, too! A woodworker's delight. Plan #120 ... only $4.00.

CATALOG 150 diff., full-size pref. plans—$1.00 refunded with 1st order. $1 FURNITURE DESIGNS, Dept. PP-27, 1425 Sherman Avenue, Evanston, Ill. 60201

Learn LANDSCAPING

TRAIN AT HOME for exciting hobby or career. Start your own spare or full time Contracting business, work in Garden/Nursery field, or landscape your own property — we show you how. FREE BOOKLET describes opportunities. *No salesman.*

LIFETIME CAREER SCHOOLS
Dept. A-228
2251 Barry Ave.,
Los Angeles, CA 90064



BASEMENT TOILET

Flushes up to existing sewer or septic tank by powerful, self-contained pump operated by normal water pressure. No digging up floors. Clog resistant, easily installed. Make basement into game room, den, apartment with private bath. Financing available. Write for free literature.

SANDERS, Dept. J-25, Box 92102, Houston, Tx 77206.

UNIQUE SPORTS CAR KIT
for VW. Fun, Easy to Build...
Send $2 for 20 page color catalog, prices, specs and info on being a 917 representative.

Special Offer

Laser 917
Elite Enterprises Inc.
Dept. PM-2
690 E. 3rd St.
Cokato, MN
55321

ROTO STRIPPER
Powers Paint Off
FASTER, CLEANER EASIER, than any other way!

- FURNITURE
- WROUGHT-IRON, MASONRY
- AUTOS AND BOATS
- HUNDREDS OF OTHER JOBS!

Never buy expensive, paint removers again. Caustic chemical removers are dangerous to skin and eyes and highly flammable.

Works on a patented new principle to do the job cheaper, safer and last a lifetime. Made of solid steel, not cheap plastic! High-speed "whipping action" makes paint, rust, scale vanish as if by magic!

FITS ANY ¼" DRILL

MIRACLE FINGERS of new space age carbon steel alloy

BOATS, HOUSE SIDING, does all big jobs in a fraction of the time.

STOPS RUST DEAD, strips rusted spots down to the bare metal fast! Cleans masonry and swimming pools effortlessly.

SAFE TO FINE FURNITURE when used as directed. Leaves a satin smooth finish, ready for paint or stain. No sanding needed (won't raise wood grain as liquids do).

SUPER VALUE only $12.95

Made in America
FULL INSTRUCTIONS INCLUDED

RUSH ORDER COUPON

ROTO-STRIPPER/Thompson Tool Co., Inc.
(Dept. PM1) 1 East Lakeview Drive, Norwalk, Ct. 06850

Please rush ____ ROTO STRIPPERS @ $12.95 ea., two for $23.95. Sorry, no CODs. Add $1. handling for each.

Order: ☐ COARSE for big jobs. ☐ FINE for furniture.

I enclose $_____. Charge: ☐ BankAmericard ☐ Master Charge

Card No. _____ Exp Date
(PLEASE PRINT)

Name _____

Address _____

City _____ State & Zip _____

ADD APPLICABLE SALES TAX

FIGHTERS (Continued from page 193)

place, cover them with Silkspun Coverite. It saves tedious filling and sanding and enables you to apply a good finish without the usual problems. Brush on several coats of clear dope, covering both sides, and when dry, sand each coat with No. 400 wet/dry sandpaper used dry. Now cement the wing in place, then the tail sections after first painting.

Apply three coats of clear dope to the rest of the plane and sand each with No. 220 sandpaper. Follow with four coats of sanding sealer, let dry for several days and sand again.

Paint the upper half of the fuselage sides light gray, the lower half and the underside of the wing white. The cockpit windows are silver, the jet intakes black and the intake rims red. Add Navy decals. The panel lines are made with a pen. Protect the decals and panel lines from fuel damage with clear dope, spraying or brushing very lightly. Allow to dry for several days. For a really slick finish, gently rub the surface with a wet cloth and polishing compound. Wipe dry, apply car wax and buff.

Tie a length of thread to a pin and press it into the fuselage at the balance point indicated. Raise the craft by the thread and add weight (wood scrap or light metal) to the nose or tail until the airplane hangs level. Never fly a plane that's tail-heavy.

Hook up two 20-ft. lengths of dacron flying lines and make sure the knots are tied tight. Before each flight, check the elevators for freedom of movement.

Vigilante III is very stable in flight. On landing, anticipate when the engine will run out of fuel and take her down near the ground. The craft won't drop like a brick, but neither will it glide very far. It has a high sink rate.

The F-15

The F-15 is built basically the same. Start with the fuselage, install the formers, firewall and landing gear. The fuselage sides are made of 1/16-in.-thick sheet balsa. The canopy is from a Scientific or similar Mustang kit, and is blended into the fuselage with plastic balsa or a filler of your preference. Finally add the remaining essentials—engine, bell-crank, wire and control horn. Wing and tail surfaces are installed in the same way as the Vigilante III.

The F-105

The F-105 is simpler to build than the other two because it has a "profile" fuselage that requires no bulkheads, coverings and the like. The wing is cut from ⅛-in. balsa and brushed with several coats of clear dope. Apply it to both sides at a time to avoid warping. When dry, sand with No. 400 wet/dry sandpaper.

The fuselage is cut from 3/16-in. balsa and is notched where the wing goes. Cut the engine doublers from 1/16-in. plywood and epoxy them to the nose as shown. Cut the fuselage and doublers to fit your engine. The vertical stabilizer is cut from 3/16-in. balsa and can be either glued to the fuselage or be a part of the same piece. Cut the rudder and glue it into the offset shown. The ventral fin is cut from ⅛ or 3/16-in. balsa and glued to the bottom of the fuselage.

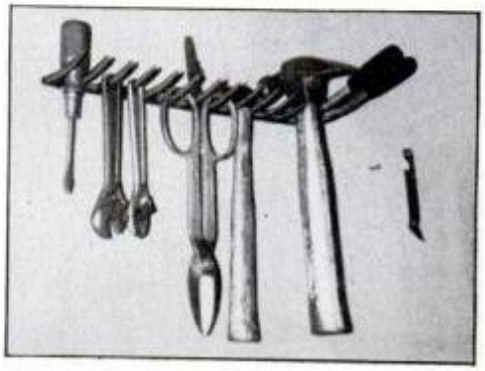
Cut the horizontal stabilizer and elevator from ⅛ or 3/16-in. balsa. Sand to shape and glue the stabilizer to the fuselage. Attach the elevator to the stabilizer with cloth hinges. Add the ⅛-in.-plywood horn to the elevator. Sand the edges of the fuselage, vertical stabilizer and ventral fin.

Install the wing to the fuselage with epoxy. Epoxy the bellcrank mount and the hardwood line guide, then the balsa tank-position guide.

Since the wing is already treated with clear dope, brush several coats on the fuselage and the rest of the model. Sand and camouflage the plane and install the engine. Lash on the ¾-oz. fuel tank with rubber bands. An optional wire landing skid can be added. Install the bellcrank and the wire.

Balance the plane as before, adding weight to nose or tail if needed. Hook up 25 to 35-ft. dacron flying lines. Before each flight, check the elevator for freedom of movement. On take-off have your helper run a few steps and then gently launch the plane. On landing, anticipate when the fuel will run out and fly straight and level. When the engine quits, glide the plane in and apply the up elevator just before touchdown. ★★★

Hang tools on a rake rack

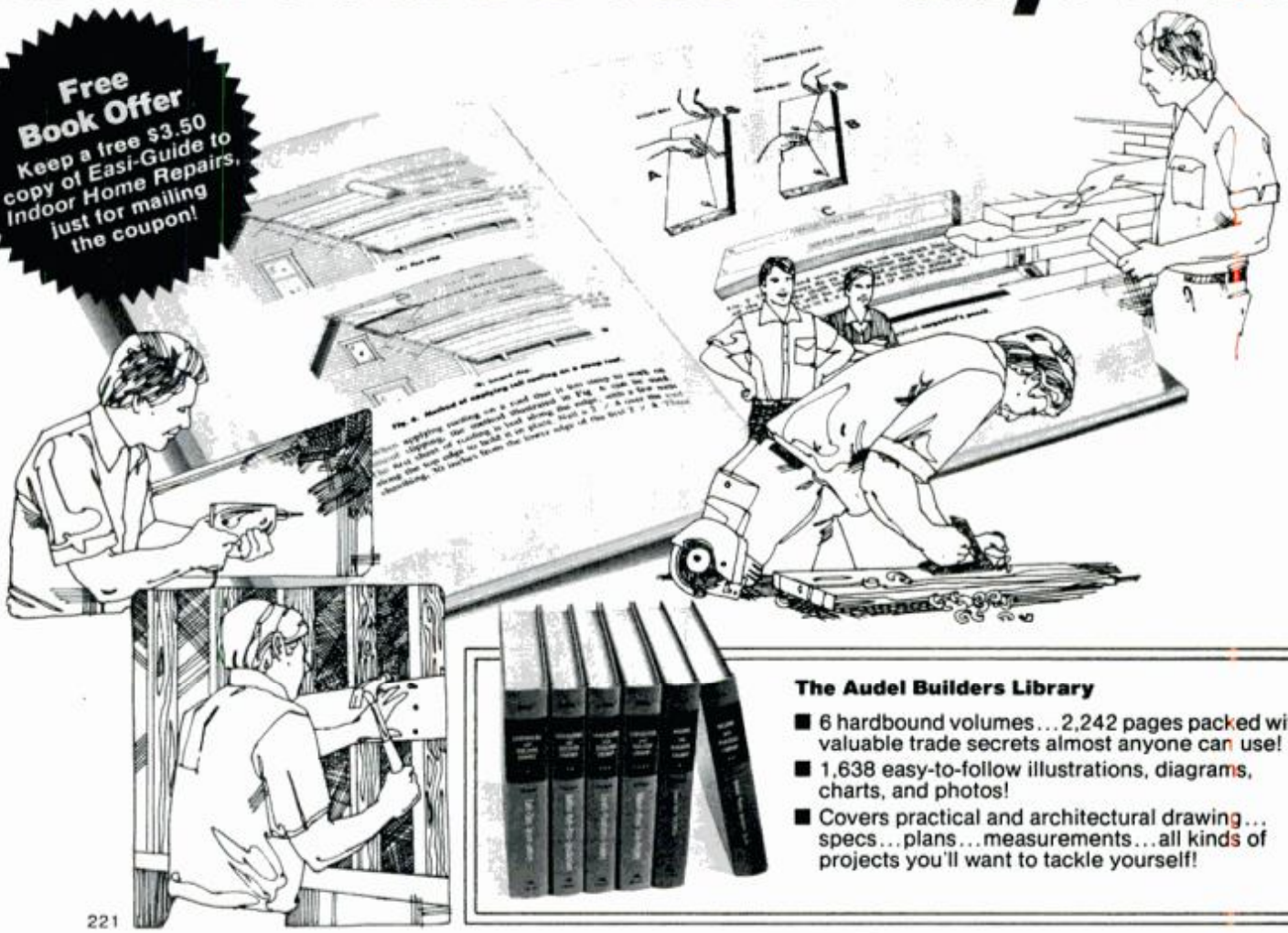


Remove the broken handle of your old rake and fasten the head to a wall in your workshop or garage. It's a handle toolholder.—*Max Calkin*

Материал, защищенный авторским правом

Discover the builders' trade secrets for 15 days free!

Free Book Offer
Keep a free $3.50 copy of Easi-Guide to Indoor Home Repairs, just for mailing the coupon!



221

The Audel Builders Library

- 6 hardbound volumes...2,242 pages packed with valuable trade secrets almost anyone can use!
- 1,638 easy-to-follow illustrations, diagrams, charts, and photos!
- Covers practical and architectural drawing... specs...plans...measurements...all kinds of projects you'll want to tackle yourself!

Here are just a few of the secrets you'll discover in 2,242 fact-packed pages:

- **Discover how to build, plaster, and panel walls.**
  Practical advice about material... methods for avoiding cracks... techniques for finishing and paneling.
- **Discover how to prime, paint, and finish.**
  Important information on paints... equipment...techniques for mixing, priming, spray painting, and finishing on different surfaces inside or outside.
- **Discover how to select, install, and repair your roofing.**
  Expert advice for selecting and installing material...and repairing leaks.
- **Discover how to build your own fireplace or patio.**
  Time-saving tips for increasing your home's value by building a fireplace, patio, walkway, or even a barbecue pit.
- **Discover how to design your own home workshop.**
  Valuable information on the art of planning a modern home work center and stocking it with the right tools.

107 chapters filled with carpenter and mason trade secrets for building with wood, brick, concrete, stucco, and tile!

What *is* a trade secret? It's a shortcut... a technique...an idea. It's knowing how to do a better job an easier way.

Trade secrets are actually what the Audel *Builders Library* is all about. Shortcuts, techniques, and ideas by the hundreds ...many of which have never appeared in print before. A wealth of knowledge for professional carpenters and masons, as well as Sunday do-it-yourselfers!

See for yourself—sample the latest edition of the Audel Builders Library for 15 days free!

The Free-Book/Free-Trial Coupon invites you to discover all these trade secrets free. Please your family; impress your friends! Build a home workshop... install some shelving...plan a patio... lay a sidewalk...or add a fireplace.

Find out which tools to use and how to use them most effectively. Pick up a fast working knowledge of plans, measurements, or specifications. Browse the chapters that cover every phase of carpentry and masonry from foundations to roofing to sidewalks.

At the end of 15 days, if not entirely satisfied, return the volumes and owe nothing. But, just for mailing the coupon, you get to keep a $3.50 bonus copy of *Easi-Guide to Indoor Home Repairs* absolutely free!

Send no money—mail coupon today!

FREE-BOOK FREE-TRIAL COUPON

Yes, please send me the *Builders Library* (#23251) to use for 15 days free. If not completely satisfied, I may return it and owe nothing. Otherwise, it's mine to keep for only $34.20, plus delivery.

And, whatever I decide, a gift copy of *Easi-Guide to Indoor Home Repairs* (valued at $3.50) is mine to keep free!

Name _____ please print

Address _____

City _____

State _____ Zip _____

Save shipping and handling costs. Enclose full payment (plus sales tax, if applicable). 15-day return privilege still applies.

Mail to: **Audel**
4300 W. 62nd Street
Indianapolis, Indiana 46206
A Division of Howard W. Sams & Co., Inc.

CC-26

Материал защищен авторским правом

You can profit from the growing demand for on-location cleaning.

Carpet Deterger

Upholstery Deterger

Wall Deterger

If you can ✓ check at least 4 of these benefits

—you owe it to yourself to get all the facts about this money making opportunity.

I'm looking for good income from—

- A fast-growing service everyone needs—on-location cleaning of carpets, upholstery and walls in homes and commercial buildings ☐
- Repeat business from satisfied customers ☐
- Work my own hours—part time or full time ☐
- Keep all I earn because I will own my equipment. (No payments of fees, dues or royalties) ☐
- Easy to use lightweight, professional equipment. (No special skills, education or experience needed) ☐
- Work out of my own home ☐
- Free continued guidance to help me every step of the way ☐
- A surprisingly small investment ☐

As a Von Schrader Associate, you have a complete plan for success. And right at the time when a fine opportunity couldn't be more welcome!

The way to independence

Have a profitable business of your own. Instead of working all your life for someone else and staying tied down, you can control your income. Make it grow bigger month by month, year by year. And you can start without leaving your present job!

Excellent income

These days, homes, businesses and public places everywhere have wall-to-wall carpeting. And walls and ceilings. All can be cleaned on-location beautifully and profitably with Von Schrader Detergers.

It's true! Unlimited opportunity is waiting for you as a Von Schrader Associate. How much you earn depends almost entirely upon the time and effort you put into it.

Your own boss!

Von Schrader Associates aren't dealers, licensees, franchisees, contractors or lessees. They pay no dues, fees or royalties. They work full or part time, as they wish, with their own Deterger(s).

We back you 100%

We help you reach your full potential. We show you how to get customers and provide advertising materials and literature with each Deterger. Our counsel is yours at no cost—now, later, always.

Remarkably small investment

Start your on-location cleaning service for much less than you imagined. Our complete, free booklet shows you how you can take advantage of an opportunity you can't duplicate anywhere else.

Anyone can get professional results with proven, high-quality Von Schrader Detergers. Simple in design, they're easy to operate, give quick results. Each Deterger includes all necessary accessories and a supply of cleaning materials. Many Associates start with one Deterger and then, as business grows, get all three.

Success speaks for itself!

If you were to meet our Associates, you'd see their enthusiasm. Hear them tell of their success and personal satisfaction. You'd learn how many have expanded into a complete on-location cleaning service. And how they've become financially independent.

Find out how you can do the same. Take that important first step right now. Mail the coupon today. You've nothing to lose and everything to gain.

"Let me send you our free booklet that gives all the facts"

—Francis von Schrader, President

Read about the big demand for on-location cleaning, see why Von Schrader Detergers are the finest of their kind, how easy they are to operate. Learn how other men have become financially independent, how Von Schrader helps you every step of the way. *Extra! Special Recorded Message included with booklet.* Listen as Francis von Schrader talks to you personally about your growing future using Von Schrader Detergers.

VON SCHRADER company

41 years of helping people earn good money
1027 Place, Racine, Wisconsin 53403
Mail complete information. I understand no salesman will call to bother me.

Name _____
Street _____
City _____
State _____ Zip _____

BEST BUY!

EASY-TO-ASSEMBLE KIT

ONLY **$355** F.O.B.

4 FOOT DIAM. ADJUSTS TO FLOOR-TO-FLOOR HTS. OF 8'1½" TO 9'6". OTHER DIAMS. FROM 3'6" TO 6' AT COMPARABLE SAVINGS.

People who've looked everywhere tell us there isn't another spiral stair around that touches our combination of price and quality of materials and workmanship. We believe it!

CALL OR WRITE FOR FREE BROCHURE:

To: The Iron Shop, Dept. PM-2 Box 128, 400 Reed Road, Broomall, Pa. 19008
Our Tel: (215) 544-7100. We accept Master Charge and BankAmericard
Please send your free brochure to:

Name _____ Street _____
City _____ State _____ Zip _____

THE IRON SHOP
MANUFACTURERS

CAN'T SHOOT!

That's right, these precision-built replicas of famous firearms CANNOT CHAMBER OR FIRE REAL AMMUNITION! Made of machined metal, they look, feel and weigh same as the originals. CAN BE DISASSEMBLED. Over 30 blued, hand-finished parts. Comes fully assembled. Safe and perfect for display. MONEY BACK GUARANTEE. Send $1.00 for COLOR CATALOG of over 60 different models. Model shown: U.S. GOVERNMENT .45 AUTOMATIC #300 ONLY $32.95 Add $2.50 Postage

REPLICA MODELS, INC. Dept. PM-2
810 FRANKLIN STREET, ALEXANDRIA, VIRGINIA 22314

WOODWORKERS!

At Last! A newspaper for both novice and veteran bringing you over 75 PLANS per year for building the best of Early American, Shaker, English, Contemporary furniture, clocks, toys, gifts, lamps, and much more — ALL FOR LESS THAN 8¢ PER PLAN

Plus jig-building, shop tips, antique restoration, money-making ideas.

Woodworker's Journal DEPT. S1
P.O. BOX 943 NEW MILFORD, CT. 06776

SIX ISSUES PER YEAR FOR ONLY $6.00
Canada and foreign $7.00

BUILD YOUR OWN TRAVEL TRAILER

Scamp

EASE OF ASSEMBLY

For the first time - a fiberglass Do-it-Yourself Kit! No welding. Scamp kit includes all parts you need and fully illustrated step-by-step assembly manual. Scamp can be completed in 60 hours with minimum tools. Also available ready to hitch-up-and-go. Ideal for hunting - fishing - camping. Sleeps 4. Fully guaranteed. 950 lbs. fully equipped. 85 lbs. tongue weight.

Scamp master charge

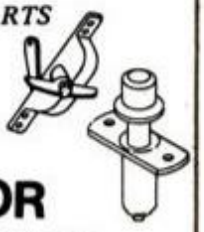
Write: SCAMP, DEPT PM-2, Backus, Mn. 56435
Rush 12 pg. full color catalog. $2.00 enclosed.

Name _____ Age _____
Address _____
City _____ State _____ Zip _____
Home Phone (____) _____
Business Phone (____) _____

Do-It-Yourself

Replacement Parts Catalog

"Hard - To - Find" REPLACEMENT PARTS FOR...



WINDOWS
Residential
Mobile Home

PATIO DOOR
CLOSET DOOR
GARAGE DOOR
STORM DOOR

Our new Catalog illustrates hundreds of hard to find, do-it-yourself, replacement parts for WINDOWS (wood, steel, aluminum, & mobile home); PATIO, CLOSET, GARAGE, and STORM DOORS. SECURITY and SAFETY items for the home are also offered. Get an early start on home improvements and repairs.

For your catalog, send only $1.00, which will be credited to your first order.

HOME REPLACEMENT CENTER
Box 40, Dept. PM
Fort Littleton, PA 17223

Копия для частного пользования авторским правом

MILITARY STUFF

1000s of things: GUNS, JACKETS, BOOTS, METALS, RIBBONS, WINGS & RINGS + OUTDOOR STUFF — SEND 50¢ ($1 for 1ST CLASS) for over 50-page catalog to: **KEN NOLAN,** HQ 1, 16901 Milliken, POB C-19555, Irvine, CA 92713. (714) 556-6262.

HARDWARE & PLASTIC GUIDE

436 pages of the most complete illustrated catalogue, for craftsmen, the industry ever produced. Order your copy today. $3.50 ppd., deduct from 1st $15.00 order.

OUTWATER HARDWARE CORP.
365C River Dr., Garfield, N.J. 07026

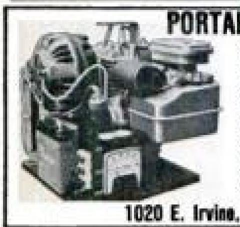
FIND TREASURE!

FREE Literature!

Detect deeper, locating gold, silver, rings, coins with a world-famous White's metal detector!

DEPT. PA 7-D
1011 PLEASANT VALLEY RD. SWEET HOME, ORE. 97386

PORTABLE ELECTRIC POWER



Build your own 110-Volt Electric Plant from used parts. Will operate lights, power tools, heating units, brush-type elect. motors, plus charge batteries and arc weld. Ideal for boats, campers and portable shops. Plans $6.00 check or M.O. **CHAPALA CO.**
1020 E. Irvine, Dept. MO, Tustin, Calif. 92680

MAKE TIFFANY-TYPE LAMPS

Enjoy foil stained glass crafting with our new patented system. Semi-KIT includes pattern on molded FORM, accurate PAPER PATTERNS, INSTRUCTIONS. Send 50¢ for brochure showing 24 lamps in color, booklet on art glass, glass cutting and catalog of kits and supplies.

H.L. WORDEN-GRANGER, WA 98932

BUILD YOUR OWN POWER TOOLS

SAVE $50 TO $500

METAL PARTS KITS AT LOW FACTORY DISCOUNT PRICES FOR:

- 12-IN. BAND SAW
- 18-IN. BAND SAW
- 6-IN. BELT SANDER
- SPINDLE SHAPER
- 10-IN. TILT/ARBOR SAW
- COMB. DRILL PRESS-LATHE

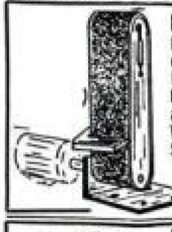
PLANS Full Size Patterns $2.00 EACH DEDUCTIBLE

KITS FROM $29.99 TO $104.99

Step-by-step plans, photos show how. No machining or welding. 71,000 in use. **5-Year Guarantee. Send $2.50 for plans (Ppd.) or 50c for Catalog. GILLOM MFG. CO. Dept. PM-2, St. Charles, Mo. 63301**

2 BAND POLICE-FIRE "SCANNER" FITS ALL CARS!

WORKS with **ANY CAR**—Portable or **HOME RADIO!** Just **PLUGS** in—No wiring—3 minute hookup! Switches instantly from regular radio to **ALL POLICE—FIRE—EMERGENCY—TAXI—STATE-GOV'T** 2 way radio calls! Works Everywhere—No Crystals needed! **Dual Band** 30-40 & 150-175 MHZ. **SEND ONLY $2.00** (cash Ck M.O.) and pay postman **$17.99** + COD postage or send $19.99 for PPd Del in USA. **COMPLETE** with **Antenna and Plug in to use with ANY Home or Portable Radio!** Full instructions—1 year Service Warranty—**10 DAY MONEY BACK TRIAL—SOLD ONLY** Direct from Factory—**WESTERN RADIO DEPT. BPM-2, KEARNEY, NEBR. 68847**



Belt Sander—

Belt Sander 3" x 24". This sander can be used vertical or horizontal. It is rugged all steel construction, ball bearing idler drum, easy belt adjustment, direct drive or pulley. Weight 8 lbs. Priced at only $19.95. Shipping $1.50.

DO-ER TOOLS INC.
35072 Normandale Branch, Mpls. Minn. 55435

PLANS AND INSTRUCTIONS FOR

Go Kart	$2.00
Mini Bike	$2.00
Mini Car	$3.00
Pedal Boat	$4.00
12" Sail Boat	$4.00
Snowmobile Sleigh	$3.00
Mini Jeep	$3.00

Mini Vehicles Plans
Dept.-C
Chazy, N.Y. 12921

SAVE ELECTRIC POWER!

Save up to 80% electrical power with this unique, inexpensive, portable, permanent and legal method applicable for shops, homes, factories, businesses, farms, sites. 100% Refund Guaranteed if not scientifically sound or if it employs gimmicks.

FREE Information

CONSUMERTRONICS CO.
P.O. Box 542B Alamogordo, N.M. 88310

MEN! WOMEN! Learn To Make Jewelry at Home in Spare Time!

MAKE REAL MONEY plus all the jewelry you want to make...

We show you what to do... how to do it... step by step. Your cost a few dollars — retail value hundreds of dollars. No special skill needed. So easy you'll wonder why you ever buy at retail. Learn casting, inlays, channeling — in silver and gold. Cut, polish, mount stones. Where to buy, what to charge... everything to make and sell jewelry for big profits.

Big Profit Home Business

EASY TO FOLLOW STEP-BY-STEP INSTRUCTIONS complete with drawings, diagrams and photos explain how to use simple tools and materials you receive with your course. You get investment casting materials, tools for handling your jewelry—polishing, cleaning, oxidizing... pliers, knives, etc. ... for setting stones, decoration. How to use special tools for cutting, sawing, filing and soldering, plus much, much more.

MAKE MONEY PROFITS LIKE THIS!

Turquoise bracelet sells for $395.00... cost of materials $60.

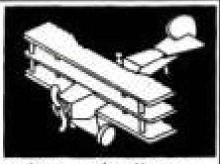
Channeled silver eagle inlayed with coral and turquoise sells for $700.00... cost of materials $85.

• Send for FREE FACTS ... color brochure — shows what you can do, how easy it is, how much money you can make, a profitable hobby for men and women of all ages. **Mail this coupon for FREE FACTS!**

Careers by Home Study • **JEWELRY DESIGN CENTER,**
4401 Birch St., Dept. PB017 Newport Beach, CA 92663
Send me Free Facts and color brochure on how I can learn all about Jewelry as a hobby or career for just a few dollars a month — no obligation — no salesman will call.

"How to Make Money Making Jewelry"

Name ________ Age ____
Address ________
City ________ State ________ Zip ________



BUILD THESE WOODEN TOY W.W. I PLANES

The Red Baron's Triplane and the Sopwith Camel Biplane, plus a biplane racer and seaplane. Planes measure nearly 12" L. Full size woodworking drawings make it easy. *$3.00 ppd (Cal. Res. add 18¢ s/s Tx)* Our catalog of 75 toy plans and toy making supplies is included free with plan order. Catalog alone is 50¢

Love-Built Toys & Crafts
3517 Camby Rd, P.O. Box 769
Dept. PE-2, Antioch, California 94509

FREE SAMPLE IMPORT — MEN WOMEN START MAIL ORDER HOME IMPORT BUSINESS

I'll send you a free sample import to prove you can make big money in your own spare/full time business. No investment in stock. World's most famous importer will guide you. Clip this ad, good for free sample and big Free Report — tells all! Offer limited to adults. Mail this ad today. **THE MELLINGER CO.,** 6100 Variel Ave., Dept. E2252, Woodland Hills, CA 91364.

AMAZING ELECTRONIC PRODUCTS

Lasers super powered, burning, cutting, rifle, pistol, pocket—see in dark—shotgun directional mike—unscramblers—giant Tesla—Stunwand—TV disrupter—energy producing, surveillance, detection, electrifying, chemical, ultrasonic, cb, aero, auto and mech devices, hundred more—ALL NEW PLUS INFO UNITED PARTS SERVICE.

CATALOG $1. **INFORMATION unlimited**
BOX 626 LORD JEFFERY ST. • AMHERST, N. H. 03031

SEND THIS COUPON

Name ________
Address ________
City/State/Zip ________

FOR THIS CATALOG

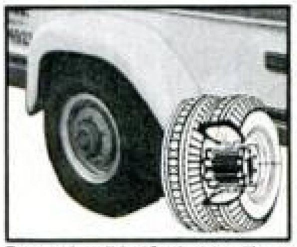
SAVINGS TO 90% ON GOVT. SURPLUS

- **Electrical**
- **Mechanical**
- **Hydraulics**
- **Marine • Auto • Hardware, etc.**

Send 50¢ for catalog or $1 for extra-fast delivery.
Satisfying customers world-wide since 1945

AIRBORNE SALES CO. Dept. PM77
8501 Steller Drive, P.O. Box 2727
Culver City, Ca. 90230. Since 1945.

RICKA DUO-WHEEL ADAPTERS AND FIBERGLASS FENDERS GIVE YOU...



- Increased traction
- Longer tire life
- Greater dual operating safety
- Increased load-carrying capacity
- Splatter protection
- Sway control

Easy to install in 10 minutes with regular rim wrench. Just cut wheel clearance, paint fender and bolt. No costly body work. Fit most mini-pickups, ½, ¾ and 1 ton trucks. Ricka Duo-Wheel Adapters transfer load from outer wheel to hub. No damage to wheel bearings or axles. Own the "grabber."

Write RICKA MFG. DEPT -RPM-2, Pequot Lakes, MN. 56472 for illustrated brochure.

Name ________ **Age** ____
Address ________
City ________ **State** ________ **Zip** ________
Phone: Bus. ________ **Home** ________

"OUR FOUNDRYETTE" BLAST FURNACE

SINCE 1935

Hobbyists. Schools. Inventors, etc. Make your own castings of any metal from cast iron down to lead and zinc. Available in sizes from 1½ to 285 lbs. RED BRASS. Complete units furnished with all sizes. Send 25¢ for circular.

KANSAS CITY SPECIALTIES CO., INC.
Dept. P-2, P.O. Box 193, Middleton
Wisconsin 53562

PATENT SEARCHES

Patent Searches include max. speed, full Airmail report, copies of closest Patents. Quality searches expertly administered with complete secrecy guaranteed. Ask for Free Record of Invention Form and Free "Patent Information"; write
Washington Patent Office Search Bureau
734 15 St., NW, Suite 709-B, Benjamin Franklin Substation, P.O. Box 7167
Wash. D.C. 20044

SILVO (BRAND NAME) TOOL CATALOG

Thousands of Exciting Tool Values! Stanley, Skil, Millers Falls, Wellsaw, Dremel, Disston, Helios, Speedy Sprayers, Plumb, Kennedy, Huot, Rockwell, Channellock, Crescent, Vise-Grip, Ridgid, Unimat, Audel Books, Nicholson, General, Indestro, Xacto, Wiss, Pony Clamps, Wen, and many other Nationally Advertised brands of Tools & Supplies. We ship Coast to Coast at prices hard to beat. **Send $1.00 for our big 168 page tool catalog today.**

SILVO HARDWARE CO.
107 Walnut St., Dept. PM-2, Phila., Pa. 19106

Universal Router/Shaper Table—Ideal for shaping and jointing small materials that are normally difficult to handle. Build picture frames, plaques, or easily add a decorative touch to mouldings. Features miter gauge for safe cutting at any angle. Accepts most router Skil, B&D, Stanley or Rockwell — Add $2.50 for shipping — Reg. $16.95
71025-537 P—7 lbs. .... **Special—$10.98**

Материал, защищенный авторским правом

An expert tells you how to get back in shape!

Our files show that thousands of men want to get back in shape, but don't know how to go about it. We decided to ask an expert, Mike Fretault, leading fitness authority. Here are his answers.

Q. How can I get back in shape?

A. There is only one answer to that: get more exercise.

Q. Won't sports do the trick?

A. Sure, sports are great, provided you practice a "complete" sport like jogging, swimming or rowing a few hours every week. Unfortunately, most men don't have the time or energy for that.

Q. How about calisthenics?

A. Also very good, but even a beginner's program should comprise at least 200 to 300 repetitions. Most men find calisthenics tiring and boring and give up after a few workouts.

Q. Isn't there an easier way?

A. There is one outstanding home training method I use and recommend. It's fast, it's easy and it keeps you interested because during every workout you actually see your strength increasing on the built-in Powermeter gauge.

Q. What's it called?

A. Bullworker® training. It's based on Isometric techniques which have been proven to increase strength three times faster than conventional methods.

Q. How long does it take?

A. The introductory "get back in shape" program requires only 70 seconds of exercise per day. The complete advanced training program takes about 5 minutes.

Q. What kind of results can I expect?

A. After 2 or 3 weeks of introductory training, most men can see an increase in strength of around 10% and measure an extra inch or two of muscle on their shoulders, chest, biceps—and an inch or two less flab around the waist.

Q. But it's hard work, isn't it?

A. Absolutely not. Most men between 15 and 65 in good general health can run through the full program without getting tired. Bullworker training is progressive so you perform better each time, yet the training always seems easy to you.

Q. What can I expect from continued training?

A. The sky's the limit. There are specialized exercises for building-up or trimming down any part of your body you want to: broad, muscular shoulders—bulging biceps, powerful wrists and forearms—a deep, manly chest tapering down to a flat, trim waist—muscular thighs and calves. You can expect strength increases of up to 4% a week; that's 50% in just three months and I have seen many men go on to double and even triple their strength.

Q. How can I find out more about Bullworker?

A. I suggest you write for the Free Booklet in color. It contains complete details about Bullworker training and tells you how you can try a Bullworker for two weeks in your own home without cost or obligation.

© BULLWORKER SERVICE, 201 Lincoln Blvd., P.O. Box 20, Middlesex, N.J. 08846 246

FREE BOOKLET

BULLWORKER SERVICE • Dept. BW2601
201 Lincoln Blvd., P.O. Box 20, Middlesex, N.J. 08846

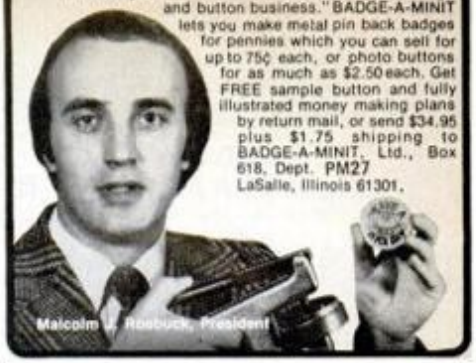
Please send me my FREE full color brochure about BULLWORKER 2 without obligation. No salesman will visit.

Name _____ Age _____
(please print)
Street _____ Apt. No. _____
City _____
State _____ Zip _____

Canada: Home delivery duty paid. Ask for FREE booklet.

"MAKE $25 TO $100 PER HOUR"

"I'll show you how to cash in on the profitable badge and button business." BADGE-A-MINIT lets you make metal pin back badges for pennies which you can sell for up to 75¢ each, or photo buttons for as much as $2.50 each. Get FREE sample button and fully illustrated money making plans by return mail, or send $34.95 plus $1.75 shipping to BADGE-A-MINIT, Ltd., Box 618, Dept. PM27 LaSalle, Illinois 61301.



ELECTROPLATING EQUIP.
Portable Platers, Supplies & "Know-How"

Build your own tanks for Nickel, Chrome, etc. Easy-to-install PVC liners. Rectifier components—all sizes. Schematic parts lists, formulas, operating instructions for all plating. Guaranteed to save 25%-75%. Some good used units for sale.

Send for FREE details.
PLATERS SERVICE CO.
2990-PM Supply Ave., City of Commerce, CA 90040

BURIED TREASURE

Locate from a LONG DISTANCE! with Ultra-Sensitive *DIRECTIONAL* Locator
SEND FOR FREE INFORMATIVE BROCHURE
RESEARCH PRODUCTS
BOX 13441-AM TAMPA, FLORIDA 33611

MIRACLE LIGHT
AMAZING INVENTION SELLS LIKE CRAZY!

Miracle Light is an ingenious self-contained light source that works without electricity, without batteries, without flame, without any conventional source of ignition. Its brilliant light can be seen up to a mile away! Great for camping, fishing, sporting events. Indispensible as a warning light, signal light, flashlight, boating light, party light. **EARN EXTRA MONEY.** Show this incredible Light to friends, neighbors, fellow-workers and watch them stare in disbelief. Every demonstration brings crowds swarming around begging to buy. People are selling thousands by just showing it and so can you! Sells on sight for only $1.95 retail. **Your low cost: 1 doz. units $15.60; 3 doz. $43.20; 12 doz. $140.40 (2 samples $3.00).**

LAKESIDE PRODUCTS CO.
Dept. PL-27; 6646 N. Western Ave., Chicago, Ill. 60645
Don't miss out! Order today.

110 VOLT A.C. GENERATORS

60 cycles, 3000 watts. Wt. 27 pounds, 5"x10" Fanbelt driven from car or pickup. Operates T.V. All power tools. Over 13,000 in service. This is our 27th year. Guaranteed 6 months. $115.50 Postpaid while supply lasts. Our X1200-watt generator needs no battery. Special price—$105.00 Postpaid.

Virden Perma-Bilt, P.O. Box 7160 PM, 2821 Mays, Amarillo, Texas 79109

Heat-catcher™
CUTS HEATING COSTS

Transforms fireplace into efficient heater. Highly recommended by users from Coast to Coast for cabins, homes, lodges. 7 models. Patented Write for Free Literature

LASSY® TOOLS INC. EST. 1939 PLAINVILLE CONN. 06062

1977 CATALOG

Hundreds of Knives, Swords, Guns, Replicas, Books and Much More.
Send $1.00 to:
EXECUTEK
777 S. Central Exp.
Richardson, Tx. 75080

BUILD YOUR OWN BEAUTIFUL MOBILE HOME
SAVE 50%
Complete easy to follow plans & do-it-yourself material Kit. No welding, Min. of tools. Send $2.50 for catalogue (Refundable)
PARTS FOR ALL MOBILE HOMES & CAMPERS.
Write Dekco Dept PM4. Menahga Minn 56464

ZZP! Seals Walls, Stops Leaks!

Now, seal seeping basements the way professional waterproofers do! ZZP! also makes swimming pools, boats, shower stalls watertight! ZZP! combines two epoxy pastes. Just mix quantity needed, brush on. Cures overnight. Withstands water pressure of 2 tons per sq. ft. Remainder keeps indefinitely. Instructions. Money-back guar.! ½ gal. kit (max. coverage 75 sq. ft.) $13.95 or 2 kits for $24.95, plus $1.25 shipping. Free literature. (Dealer inquiries welcomed!)

Construction Chemical Corp.
DEPT. M-4, R. D. 2, MONROE, CT. 06468

Boost fireplace output up to 10X

Glass Door ThermoGRATE® Unit 'Enough to heat a house'

New! Dynamic breakthrough delivers up to 100,000 BTU/hour w/glass door beauty. Total draft control. Converts fireplace to circulating heater. Stops night heat loss.

Performance & quality guarantee.

Open Fireplace ThermoGRATE® Unit

The proven original. Now 28 sizes to assure accurate fit. Heavy duty welded steel construction. Simply slide in, replacing old grate. Up to 40,000 BTU/hr with opt. blower.

Thermograte Enterprises, Inc.
Dept.M 51 Iona Lane St. Paul, MN 55117

ThermoGRATE®

SAVE HUNDREDS OF DOLLARS

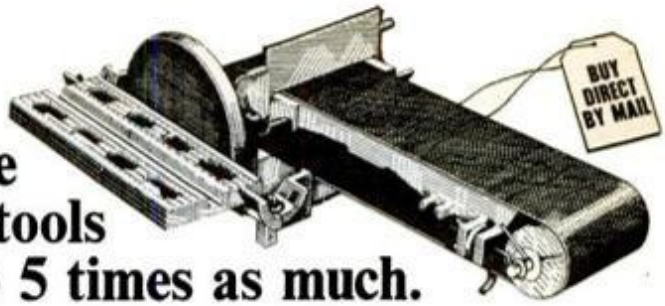
Imagine yourself the builder of this attractive ALL PURPOSE BARN 24' X 36' X 18' high with easy to follow plans. Appealing to the eye in suburban, farm, ranch, lake area. Many uses as 3 or 4 car garage, boats, campers, store, lodge. Plans call for concrete floor, ceiling joist, plywood loft flooring, suggested window and door location.

Send $6.00 for plans and material list. 24' X 36' HORSE BARN plans, showing 3 stalls, tack room $8.00.

HAMMOND BARNS, Dept. PM-75
Box 584, New Castle, Indiana 47362

USE ZIP CODES WHEN ANSWERING ADS

Unadorned power tools ...they do the same job as tools costing up to 5 times as much.



We skipped the chrome to save you money... but we did not skip anything on performance. Actually, we skipped more than just chrome, we cut out every costly frill that wasn't absolutely needed.

Our tools are not exactly flashy. We are the first to admit it. But in articles covering test results on AMT tools, written by leading publications such as Popular Science, our tools have been praised over and over again. In spite of their low prices, our tools are full scale and offer full performance and precision.

HERE'S HOW WE DO IT... First, we don't claim our tools should sell for five times the price! Just that our tools do the same job... with the same accuracy, ease and speed... and will last at least as long. AMT tools cost less to make and are sold direct. They are bona fide quality power tools used by serious amateurs and professionals alike and if sold in retail stores would be much higher in price. We use no magic, let's be specific:

SIMPLICITY... AMT tools are soundly engineered to eliminate every frill and gimmick—to minimize material and production costs. Machined parts are used only where they're needed. Unadorned cast iron and aluminum save you a fortune.

DIRECT-FROM-FACTORY SAVINGS... You save a bundle, yet we offer a double guarantee backed by a 45-year-old company with millions of satisfied customers... and hundreds of orders pour in daily.

LARGE VOLUME... Our own foundry and large mass production facilities plus large buying power all work to keep costs down.

STANDARD PARTS... Our designs use standard hardware items wherever possible. By avoiding custom-made parts we pass on tremendous savings to you.

If you are looking for power tools that perform like units costing many times our low prices, order today and you'll be one step closer to many hours of woodworking satisfaction.

Bill Monty

NOTE: Take advantage of these same low prices at our Royersford factory showroom at 4th and Spring Sts. (9 to 4:30 weekdays, 9 to 12 Sat.).

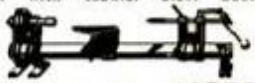
Brand new electric motor developing full 1 h.p. 17 lbs. (Purchased separately, $34.85). With any AMT machine here. **$29.90**

POWER SAW 8" tilt arbor saw . . . cross-cuts, rips, mitres, cuts, compound angles, dadoes, coves, moldings. Completely assembled with ground cast iron table, safety guard, splitter, mitre gauge. Less blade, motor. Rip fence for easier work alignment. $4.50 add'l. Ball bearing model. $9.50 add'l. Takes ⅓ h.p. motor or larger, standard blades, attachments. Wt. 22 lbs., f.o.b. factory. **$34.70**

FREE OFFER, cabinet base plans, . . . with one piece of ¾" plywood, convert your $34.70 saw into a floor model with a huge 27" x 24" top. Takes cabinet rip fence, $6.50 add'l.

BELT SANDER A precision unit. It changes from horizontal to vertical in seconds. Heavy, sander includes 4" x 36" sanding belt. Uses ½ h.p. or larger motor. V-pulley drive and multi-purpose drive spindle. Disc sander accessory, $12.50 add'l. Mitre gauge, $2.95 add'l. 18 lbs., f.o.b. factory. **$33.00**

3' WOOD LATHE . . . 6" swing. Same precision and speed as $40 units. Sturdy cast iron with tubular steel bed. Lever action tail stock, two-speed pulley, fits any motor. Set of 3 high speed turning chisels, $6.95 add'l. 4" face plate, $2.50 add'l. 15 lbs., f.o.b. factory **$19.80**



4' WOOD LATHE . . . 12" swing. Industrial size, does same job as $75 units. Tubular steel bed rails, screw action tail stock, 3-speed pulley. Use any motor. 3 high speed turning chisels, $6.95 add'l. 4" face plate, $2.50 add'l. 30 lbs. f.o.b. factory. **$44.10**

SET OF 8 TURNING CHISELS $18.00

DELUXE BALL BEARING 4' WOOD LATHE... 12" swing, similar to 4' model with heavy duty, double shielded, lubricated-for-life ball bearings. 3 high speed turning chisels, $6.95 add'l. 4" face plate, $2.50 add'l. 30 lbs., f.o.b. factory. **$54.10**

WOOD SHAPER KIT Makes beads, coves, moldings, tongue-and-groove joints, etc. Accurate cuts at high speeds. Sealed greased-for-life ball bearings. Less wood. Takes ¼ h.p. motor or larger, standard cutters. Optional hold down assembly, $3.95 add'l. 9 lbs., f.o.b. factory **$25.95**

TWO GUARANTEES

10-DAY MONEY BACK GUARANTEE
Try any of these power tools and compare it with any similar machine at any price. If not satisfied, return it for prompt, no questions asked refund. We pay the return shipping charges.

10-YR. FULL SERVICE GUARANTEE
Any part or parts of these AMT power tools (except motor which carries a one year guarantee) which become inoperative for any reason within ten years after purchase date will be repaired or replaced by the factory with no cost to the purchaser other than postage.

AMERICAN MACHINE & TOOL CO.
4th & Spring St., Royersford, Pa. 19468

BUY DIRECT ...USE THIS HANDY ORDER COUPON NOW

AMERICAN MACHINE & TOOL CO., Dept. PM27, Royersford, Pa. 19468
Please send me the units checked. Payment in full enclosed $_____ or $5 deposit each item enclosed, balance C.O.D. I must be fully satisfied or will return unit within 10 days for full refund. No questions asked.

- ☐ 8" Power Saw at $34.70
  - ☐ Standard Rip Fence at $4.50
  - ☐ Long Cabinet Rip Fence at $6.50
  - ☐ Ball Bearing Spindle at $9.50
- ☐ Belt Sander at $33.00
  - ☐ Disc Sander Attachment at $12.50
  - ☐ Mitre Gauge for Sander at $2.95
- ☐ Jointer Planer at $43.80
  - ☐ Ball Bearing Spindle at $10.00
- G.E. Motor ☐ $29.90 (with other item) ☐ $34.85 (purchased separately)
- ☐ Wood Shaper Kit at $25.95
  - ☐ Opt. Hold Down Assembly at $3.95
- ☐ 6" Swing 3' Lathe at $19.80
- ☐ 12" Swing 4' Lathe at $44.10
- ☐ Deluxe Ball Bearing 4' Lathe at $54.10
  - ☐ Face Plate $2.50) any Lathe above
  - ☐ Turning Chisels $6.95)
  - ☐ SET OF 8 TURNING CHISELS $18.00

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

Материал, защищенный авторским правом

BUILD YOUR OWN

- MOTORHOME
- 5th WHEEL
- CAMPER
- TRAILER
- COVER
- VAN

KITS · PLANS · FULL SIZE PATTERNS

GLEN-L component kits, plans, and full size patterns make it easy AND YOU SAVE $$$! Factory-like methods adapted for amateurs assure professional results you'll be proud of. Pictorial instructions cover frame construction, undercarriages, cabinetry, framing, electrical plumbing, aluminum skin, and more! Building is fun! No special skills or tools required. Dozens of models PLUS equipment, parts, aluminum skin all available at DISCOUNT PRICES! Send $1 today for illustrated RV PLANS, KITS & EQUIPMENT catalog.

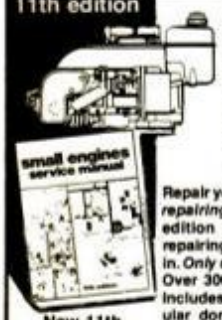
GLEN-L RV's 9152P Rosecrans Bellflower CA 90706

GLEN-L RV's
9152P Rosecrans Bellflower CA 90706
Enclosed is $..... Please rush ..... copies of RV catalog
Van Conversion Plans (all models) only $5.00
Name
Address
City _____ State _____ Zip Code _____

CUT STRAIGHT WITH 'STRATE-CUT' TM

Use "STRATE-CUT" Cutting Guide with any portable circular saw, jig saw or router. **Extends to 8'6", reduces to 51"** for short cuts and portability. Clamps to paneling, doors and other long work. Make precision 90° cuts, tapers, angles, etc. Two 51" Aluminum sections, connector, clamps, directions, only **$14.95 pp.** Send check or MO to **R.A.K. PRODUCTS,** Dept. M-6, Box 23426, Milw., WI 53223. **MONEY BACK GUARANTEE.** Wis. Res. 4% tax. SOLD ONLY BY MAIL. ONLY IN USA.

Make Money Repairing Gas Engines
NEW Small Engines Service Manual
11th edition



Tells and shows you how to fix small gas engines on Lawn Mowers, Garden Tillers and Tractors . . . and other power equipment.

Repair your own gas engines. *Make money repairing for others.* New updated 11th edition gives complete information on repairing small gas engines under 15 cu. in. *Only universal repair manual of its kind.* Over 300 pages. Nearly 900 illustrations. Includes information on nearly every popular domestic and foreign small engine (both 2 and 4-cycle) on the market. Authoritative section on gas engine fundamentals, trouble shooting, and servicing of ignition and carburetors. Down-to-earth information. Illustrated with hundreds of exploded drawings. Easy enough for beginners to understand. *Satisfaction guaranteed or money back.*

New 11th edition
$7.95
Send Check or Money Order with order and we send postpd.

TECHNICAL PUBLICATIONS Div., Dept. PM-277
P.O. Box 12901, Overland Park, Kansas 66212

DON'T QUIT SMOKING
before giving my pipe a 30 Day Trial

UNITED STATES patent number 3267941

Give it 30 days—

No cigarette, no cigar, nor any other pipe can give you the full rich flavor, aroma, deep down satisfaction, enjoyment, and peace of mind that you get from a Carey Pipe.

My new principle contradicts every idea you've ever had about pipe smoking. I guarantee it to smoke cool and mild hour after hour, day after day, without rest, without bite, bitterness or sludge. To prove it, I'll let you test smoke a Carey Pipe for 30 days. Write today for **FREE** trial offer.
E.A.CAREY, Dept. 255B-3932N. Kilpatrick, Chicago, Ill. 60641

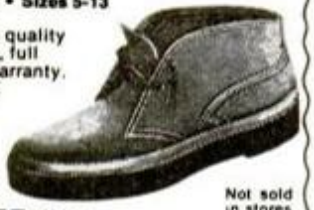
PORTABLE STEAM CLEANER
Steam in 60 seconds

CLEAN:
Engines, Air Filters, Lawn mowers. 3 year guarantee on fire box, coils. Uses liquid soap, propane fired. Weight 120 lbs. Auxiliary pump required on low water pressure.

WEDCO MFG. INC., Dept. M-7
Scott Lane-Box D, Jackson, Wyo. 83001

Men's Wide Shoes
EE to EEEEEE • Sizes 5-13

100 styles, top quality popular prices, full money-back warranty. Send for FREE CATALOG.



Hitchcock SHOES, INC.
Not sold in stores
Dept. 28A, Hingham, Mass. 02043

FIX LAWN MOWERS

FOR FUN & PROFIT! Fascinating new Handbook by F. Peterson gives you the knowledge skilled mechanics learn. **OVER 125 ILLUSTRATIONS** show how to trouble shoot repair carburetors, engines, balance and sharpen blades, etc. Exploded drawings are extensively used. **INSTRUCTIONS COVER** reel, rotary and rider mowers, preventive and routine maintenance, how to identify brand names, where to obtain replacement parts. How to buy and use a lawn mower. Friends gladly pay $10 to $50 to fix their lawn mowers. Try the HANDBOOK OF LAWN MOWER REPAIR.
Rush only $7.95 plus 60¢ handling on 10-day money-back guarantee.

EMERSON BOOKS, INC. Dept. 666C
Reynolds Lane, Buchanan, New York 10511

PERMANENT WHEEL BALANCE

Increase Tire Mileage

Easy to Install

$19.95 a Pair
Unconditionally Guaranteed

Calif. Add Sales Tax
BankAmericard, Master Charge OK....Give Wheel Size, No. Lugs, Make, Year & Model

ROAD HUGGERS
480 EAST TAYLOR • P.O. BOX 9081 • SUNNYVALE, CA 94088

BOAT KITS

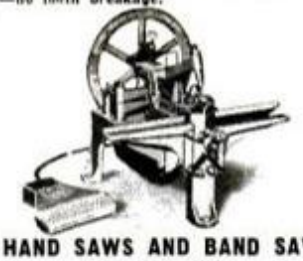
BUILD YOUR OWN BOAT & SAVE $$$

FRAME KITS, PLANS, FULL SIZE PATTERNS especially for amateurs. Send $1 ($2 Canada) for HUGE 128 pg. catalog. Includes FREE "Boatbuilding Supplies" brochure.

GLEN-L MARINE 9152 Dept T Rosecrans Bellflower, CA 90706

AUTOMATIC SAW SET

Set saw teeth automatically—400 per minute without effort. Perfect hammer and anvil action sets teeth uniformly—no tooth breakage.



FOR HAND SAWS AND BAND SAWS
Write for details
BURR MANUFACTURING CO.
8931 Venice Blvd.
Los Angeles, Calif. 90034

SAVE ON ACCORDIONS

33 MODELS — FAMOUS MAKES

Buy direct from Importer, Standard or Electronic for students, teachers, professionals. Most wanted features. Save middleman profit. 5 day home trial. Easy Terms. Trade-ins welcomed. Satisfaction assured.

HOHNER Button Models, Discount Prices!

FREE Color Catalogs and Price List

ACCORDION CORPORATION OF AMERICA - Dept. R27
5535 Belmont Ave., Chicago, Illinois 60641
Send FREE CATALOGS and Prices - Also send information on: ☐ Hohner 'button' Accordions ☐ Cordovox ☐ Accordion Amps
Name
Address
City _____ State _____ Zip _____

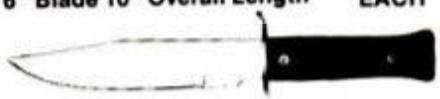
Burglar . Smoke Fire Alarm Catalog

- Billions of dollars lost annually due to lack of protective warning alarms.

FREE CATALOG Shows you how to protect your home, business and person. Wholesale prices. Do-it-yourself. Free engineering service.

Burdex Security Co.
Box 82209 Dept. PM Lincoln, Ne. 68501

ORIGINAL BOWIE KNIFE
6" Blade 10" Overall Length **$2.50 EACH**



THE FAMOUS KNIFE THAT WON THE WEST
Its sturdy blade and superb balance make it not only an excellent knife for hunting but also for every sporting condition. Comes with sheath.
Model No. K-62 Plus 50¢ Shipping DEPT. F-2-PM
WESTBURY SALES CO., P.O. BOX 434, WESTBURY, N.Y. 11590

SAVE UP TO 85% GOV'T SURPLUS and NEW EQUIP'T

DIAL TELEPHONES

$8.99
$8.79

Motor Powered Wheel $11.98

ALL ITEMS THIS AD F.O.B. LINCOLN, NEBRASKA
Include Adequate Remittance for UPS Shipping

SURPLUS CENTER PM-027 Lincoln, Nebraska

☆ **"SURE-BITE" FISH SCENT!**

● A few drops on your Bait, Lure, or Fly...sends Fish into a feeding FRENZY! Fish can't resist this Tantalizing-Aroma that says "FOOD"! ...a whiff, and they fight to get to your Lure! Acclaimed by Fishermen, and Tested under All conditions, in Lakes, Ponds, Rivers,

★ **GUARANTEED TO ATTRACT FISH!**

● **SPECIAL...only $1.49 Each.**

☐ Trout, ☐ Bass, ☐ Catfish, ☐ Other F.W. Fish.

● **HANDY "ROD-HOLDER"**

Ideal for CAMPER, BOAT or DEN. Handsome and Practical Rack

● Holds and Protects 4 RODS. Use Vertical or Horizontal on any Wall. Mounting Screws included.

★ **SPECIAL.. $2.49 PAIR**

☆ **Virgil Ward's... "FISHIN-SOAP"**

● Will not only Wash away Human Scent... ...But will also deposit a "FISH SCENT" on Bait and Lures that "FISH CAN'T RESIST"! It's Great!

● Wash hands in the Lake or Stream you are Fishing, and the Soap will milk into the water...Attracting Fish by "Scent"! Can also be used for Chumming! It will help put those BIG Fish on your Stringer.

● **SPECIAL...2 for only 99¢**

★ **"SURE-CATCH"**

● **Automatic Hook-Setter**

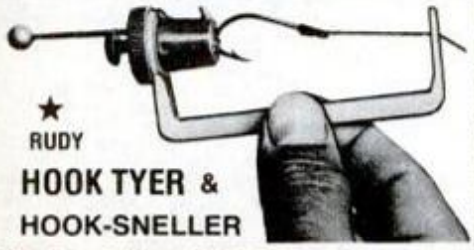
● Catches the Nibblers and Bait Stealers as well as the Strikes! It Automatically SETS the Hook in the Fish's mouth the instant you get a Bite!

● You don't lose the Big Ones. Automatic "Trigger" sets hook!

✱ GREAT for Surface or Bottom Fishing!

✱ Can be used with or without Float for bottom Fishing. Simple instructions included.

● **SPECIAL...only $2.98**



★ **RUDY HOOK TYER & HOOK-SNELLER**

Makes Tying ANY Hook a BREEZE! Just slip the Line in, Twist the Knob, Pull it Back...a Neat Uniform KNOT! Professional Knots that STAY TIED. Ties CLINCH Knots, BARREL Knots, DROP-LOOPS, End-Loops, Tapered Leaders. Also SPLICES Line! A Handy Tool for Every Fishing Need.

● **Only...$1.49**

Sports LIQUIDATORS

8942 - 30 LANKERSHIM, SUN VALLEY, CAL. 91352

SPECIAL "GET ACQUAINTED" OFFER:

☆ **25** Famous, Popular and Proven LURES All Different . . . for only **$6.95**

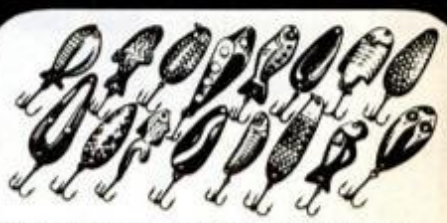
The LURES in this "SET" were chosen by Expert Fishermen, as the Most widely used, PROVEN Fish-Catching Lures in use today! Ideal to replenish any Fisherman's supply for Any and All Fishing Trips! A Great "ALL AROUND" LURE SET...for Lake, River, Stream or Pond! (Value over $20.00).

TWELVE 'Famous' SPINNERS ● TWELVE 'Famous' SPOONS

● **Lake and Stream Tested Favorites!** A large purchase enables us to offer this **Well Known Assortment of Lures ($7.00 Value)**

12 For only... **$2.95**

● **3-Sets (36 Spinners) $7.95**



● **Latest** Assortment of **Shapes, Weights** and **Actions! A COMPLETE SET** to meet every fresh-water **Fishing need. ($6.00 Value).**

12 For only... **$2.49**

● **3-Sets (36 Spoons) $5.95**

TRIPLE 'XXX' MONOFILAMENT SUPER-FINE QUALITY LINE!

SPECIAL JUMBO BULK-SPOOLS

TEST	APPROX. YDS	VALUE
4 lb.	2700	$41.85
6 lb.	2200	$40.25
8 lb.	1500	$29.00
10 lb.	1250	$26.40
12 lb.	1000	$25.00
15 lb.	750	$19.50
20 lb.	600	$18.00
25 lb.	570	$16.25
30 lb.	400	$14.40
40 lb.	350	$14.[illegible]
50 lb.	275	$1[illegible]

● New FRESH-STOCK Newest GOLD color.

✱ **The BEST!**

● **XTRA SOFT!** will not stiffen in any weather!
● **XTRA STRONG!** small diameter, low stretch!
● **XTRA INVISIBLE!** Gets more Strikes!

● **Special Discount**

ALL LB.-TEST: SAME PRICE

only **$2.95** each.

• X'TRA SPECIAL •

● **Buy 2-Spools at Discount Price of $5.45 Receive a $2.00 LINE WINDER**

✱ **SATISFACTION GUARANTEED...or Full Refund.**

#0110 ✱ ☐ **SPECIAL . . . 25 Different 'Lure-Set' . . only $6.95**

#0221 ☐ 12-Diff. SPINNERS .....only $2.95 •
#0223 ☐ 3-Sets (36) SPINNERS ....only $7.95 •
#0331 ☐ 12-Diff. SPOONS.....only $2.49 •
#0333 ☐ 3-Sets (36) SPOONS .....only $5.95 •
#5382 ☐ "FISHIN-SOAP" 2 Bars .only $ .99
#1300 ☐ HOOK-SETTER ..... .only $2.98
#1001 ☐ Triple XXX BULK SPOOL .....only $2.95 LB. Test: ____
#1002 ☐ 2-SPOOLS & LINE WINDER....only $5.45 LB. Test: ____
#1610 ☐ "Sure-Bite" FISH SCENT . . .only $1.49
☐ Trout, ☐ Bass, ☐ Catfish, ☐ Other F.W. Fish.
#1290 ☐ Handy ROD-HOLDER . . . . . .only $2.49
#1850 ☐ RUDY HOOK-TYER .....only $1.49

● Add 50¢ for Postage and handling. ● ☐ Send **FREE DISCOUNT CATALOG**

• MASTER CHARGE ☐
• BANKAMERICARD ☐
Please List
Interbank No. . . . . .
Acct. No. . . . . .
Expiration date. . . . . .

NAME _____
ADDRESS _____
CITY _____ STATE ____ ZIP ____

● Please send check ☐ . . . Cash ☐ . . . or . . . ☐ Money Order
(Because of the amazingly low price, we cannot accept C.O.D.'s)

Sports LIQUIDATORS

8942 – 30 LANKERSHIM, SUN VALLEY, CAL. 91352

Материал, защищенный авторским правом

Discover Leathercraft!

Two genuine leather kits... key fob & bag tag!

Only $1.95 with coupon below

A $6.00 retail value!

For only $1.95 you can make a genuine leather bag tag and key fob. Stamp your own design. Tools and pattern sheet included. Kit complete. Easy and fun to assemble. Tools and materials can also be used for other projects. You'll also receive a big, 116 page, full color catalog of leathercraft gifts and ideas showing other valuable things you can make from genuine leather. Start your collection of leathercraft tools & supplies!

The Mini-Kit includes:
- Key fob
- Bag tag
- 2 Craftools
- 1 oz. bottle of Hi Liter
- Pattern and instruction sheets
- Hardware
- Practice piece

Mail this coupon with a check or money order for $1.95 plus 25c postage to 2808 Shamrock, Dept. KPM6, Fort Worth, Texas 76107 (Texas residents add 10c sales tax).

Name _____

Address _____

City _____ State _____ Zip _____

Tandy Leather Company

Not redeemable for cash. Cannot be used in combination with other Tandy offers. Only one coupon per purchase.

CORE-CRAFT CANOE FACTORY DIRECT

Lifetime guaranteed fiberglass canoe. All hand manufactured. Triple keel bottom safer for families. Rolled gunwale means dryer ride. Non-skid contoured seats. Five permanent colors. No painting. Built by canoers. Oldest and largest factory-direct fiberglass canoe manufacturer. Own the quiet one, and ask about being a factory representative in your area.

Write Core-Craft, CPM-2, Highway 2, Bemidji, Minnesota 56601 for full-color catalog. $1.00 enclosed for postage, handling.

Name _____ Age ____

Address _____

City _____ State _____ Zip ____

Phone: Bus. _____ Home _____

PRESSURE-SENSITIVE

return address labels. 1X2⅞ inches. *Script* or **Gothic** type. 4 lines. Only $2.95 for 330.

New, Copyrighted 2 label Business Cards low as $9.95 for 500.

Remembrance Service Systems
Box 339
Dillsburg, Pennsylvania 17019

CLOCK LOVER'S HEADQUARTERS - USA

Largest selection of kits, movements, hardware for grandfather, grandmother, wall, shelf, school and novelty clocks.

UNIQUE 100 PAGE CATALOG
Send 50¢ today for Clock Catalog

CRAFT PRODUCTS COMPANY
Dept. 1 St. Charles, IL 60174

WRAP-A-COIN

Over 10,000,000,000 coins disappear every year. How many do you have in boxes, drawers, jars, etc.? Stack and wrap in minutes with WRAP-A-COIN. (pat. pend.) Wrappers for $100 included — pays for itself in minutes.

Send $7.50 plus $1. p&h to:
HOWARD SALES CO., Dept. PM-1
164 Radcliffe Rd., Plainview, N.Y. 11803
N.Y. res. add 8% sales tax. Satisfaction guaranteed. Allow 30 days for delivery.

BUMPER STICKER PRINTING DEVICE

SIMPLE, CHEAP, PORTABLE
ANY MESSAGE IN MINUTES
SEND FOR *FREE DETAILS*

BUMPER—MAGIC
P.O. BOX 22791 (G)
TAMPA, FLA. 33622

TOOL DEALERSHIP

200 yr. old service business in the industrial field. High repeat; order-taking type; we secure accounts; $25/hr. return on investment. $15,500 cash investment for machinery and equipment. 2 weeks training included. Contact

American Tool & Grinding
2950 S. Umatilla, Englewood, Colo., 80110
Toll free (800) 525-8365. Mr. Faircloth

DUNE-BUG

Complete plans & specs on how to build or buy - disc. prices on parts, kits, engines, & raw material.

Bug

Send $2 for DUNE-BUG pkg. to:
K & P Mfg.
330 S. Irwindale, Azusa P-2
Calif. 91702, Ph (213) 334-0334

110 VOLT "PLUG-IN" YOUR TRUCK OR CAR!

Mounts Under Dash or Hood in 10 Minutes—Has Off-On Sw.-Voltage Ind. Light! **Up To 4000** Watts—110 Volt DC **Power** from car Alternator. Runs Carpenter - Farm - Builders - Tools - Lights - Heaters - Drills - Saws. Starts Cars. Quik Charges - Welds - Brazes. Solders.

SEND ONLY $2.00 (cash, Ck., M.O.) and pay postman $17.99 plus COD postage, or send $19.99 for Paid Del. in USA. **Complete Ready To Use With Speed Control—Full Instructions.** One Year Service Warranty—**10 Day Money Back Trial**—Ideal for pickups—**All Cars-Campers**—Rush order.

WESTERN ELECTRONICS, Dept. PM2, Kearney, Nebr. 68847

BUILD YOUR TILLER FROM SEMI-KIT AND SAVE $75+

"Earn" $10-$50/hr. assembly time

You pocket assembly costs when you build the ***groundhog,*** Heald's Semi-Kit Tiller. Just 6 hours with common tools and our easy-step instruction sheet and you have a groundhog. **Groundhog features** tough 5 H.P. Techumseh engine or Briggs & Stratton with reverse. Efficient oil bath chain drive transmission. V-belt clutch protects engine and tines from wedged-tine damage. Tilling depth and bar height adjust to 15 points: 3 on handles, 3 on rear wheel, 9 on drag stake. Slasher tines (14"D.) till 26", 14" or (with option extra tines) 36" swath. Blades bite 9+" deep, yet even ladies can handle groundhog. **Groundhog converts to walking tractor** with optional 13" lug tread wheels for use with dozer blade or draw-bar and cultivator/scarifier or furrow opener/hiller attachments. Tiller kit starts at $199.95. **Send this ad, name, address to:**

Heald, Inc. Dept PM-72, P.O. Box 1148, Benton Harbor, MI 49022

Optional 13" wheels convert tiller to walking tractor

Heald groundhog 5 H.P. chain driver tiller Semi-Kit

PUMPS

BUY DIRECT AND SAVE
Drain • Irrigate • Circulate • Spray

Heavy duty ball bearing pump. All metal, rust-proof Type XB. Stainless shaft. Use ¼ HP or larger. 1 HP 1,200 GPH 60' high or 3,000 GPH 25' well. 5,200 GPH max. 1¼" in; 1" out. Belt or direct drive. **$19.95**
Type P won't rust or clog. Bronze bearing. To 2,400 GPH. 1" in; ¾" out. **$13.95**
P'od cash with order. **Money back Guarantee.**

LABAWCO, 80 Hwy 206, Belle Mead, N.J. 08502

FREE! VENEERING CATALOG

90 varieties world's rarest veneers, pre-joined veneers, checkerboards, broad choice wood band & art inlays. Illustrated in full color — at reasonable prices. Learn how to create beautifully veneered furniture, bond exotic veneers simply, instantly. Catalog shows simplified contact cement method that you learn fast. Send for free catalog now!

MORGAN VENEERS, Dept. PO1K43,
915 E. Ky. Street, Louisville, Ky. 40204

Материал, защищенный авторским правом

CLASSIFIED ADVERTISEMENTS

Rate: $2.90 per word payable in advance each insertion. Bold face capitalized words—75¢ per word additional (First word set in Bold Face at no extra charge, Zip Code Free.) Minimum insertion ten words. The next available issue to place an advertisement in America's No. 1 Classified Section is March. The closing date is January 10th.

Send remittance payable and order to Popular Mechanics. ATT.: Hildegard E. Kappel, Class. Adv., Mgr., 224 West 57th Street, New York, New York 10019. As a consumer service and in cooperation with our mail-order advertisers who use post office box addresses for their convenience in handling your order, Popular Mechanics maintains a register of such mail-order advertisers containing their complete name and street address, which is available to you upon written request.

When answering advertisements please use the zip code number

AUTOMOBILES

DISK BRAKE PACKER Pack bearings without removal of wheels rotors calipers brakes lines. Trem Products, 7B Page Rd., Bedford, Mass. 01730.

MPG Increased 30 + %. Bypass pollution controls, easily, reversibly!! Free details, Posco #GB2, 453 W256, NYC 10471.

REWIRE Seat Belt Buzzer to sound when lights left on. Plans $2.00—**VEGA** owners, Don't Spend $8.00 for air filter. Buy $3.00 Filter and reuse housing. Plans $2.00. **NYDAR** Engineering, Dept. A3, Box 535, Ripley, West Virginia 25271.

METHANOL Vapor Injector Increases gas mileage 30%. $19.95. Free details. Modern Automotive, Box 26188A, Oklahoma City, Okla. 73125.

RUSTPROOF your car! Proven low-cost!! method. Free details. Haag, 1564 Hydetown Rd., Titusville, Pa. 16354

SAVE HUNDREDS OF DOLLARS On any new car or light truck. Know dealer's cost before buying. For computed cost send make, model, options, $2.00 and S.A.E. to: Autofax, Box 1422, Greenwood, S.C. 29646.

CONVERT your automobile, home to **HYDROGEN** generators! Detailed plans and instructions $5.00. R&D Associates, Box 873-M, Concord, NC 28025.

WATER IN YOUR GAS Could cost you money. Simple test reveals Instantly. $1.25 Postpaid. Wallace, P.O. Box 112, Anthony, Fla. 32617.

CAR Salesman's Secrets. Send $1.00. CSS, Box 4181, Elmira, N.Y. 14904.

TIRE Disposal Cutting Machine Plans, Details Free. Prestosplit, Box 18032, Minneapolis, Minn. 55418.

STOP WASTING GAS!!! Patented device corrects fuel mixture. Details Free. Northco, Dept. 3A2, 755 Boylston, Boston 02116.

MIDGET CARS

YOUR AD IN POPULAR MECHANICS WILL BE SEEN By More than 5,000,000 active buyers for your products and services. It costs only $2.90 per word. And, if you wish to run all or part of your ad in bold capital letters—you can do so for as little as 75¢ per word additional. Act now! Send your Classified ad to: **POPULAR MECHANICS, CLASSIFIED DEPARTMENT, 224 WEST 57TH STREET, NEW YORK, N.Y. 10019.**

AUTO SUPPLIES & EQUIPMENT

KNOW What your car is doing. Compute mileage efficiency with simple slide rule. $1.98 PP. Cape Meares Enterprises, P.O. Box 02393, Portland, Or. 97202. Inquiries Appreciated.

MOTALOY Ring-Valve Job While Driving!! $6.75 Postpaid. Two $12.25. Guaranteed. Andris, Dept. 263L, Box 34081, San Francisco, CA. 94134.

ALTERNATOR/Generator Rebuilding Book. Details: Hedelund, Box 5686, Las Vegas, NV. 89102.

SAVE Gas, Oil, Repairs. Details Free. Motaloy, 2532 Superior, Chicago, Ill. 60612.

PARTS: Army jeep and truck parts. Spare Parts & Equipment Co., P.O. Box 751, Lexington, Kentucky 40501.

GENUINE GM POLISHING CLOTH Shines as it cleans. Now only $3.00. Peterson, 3833 Crenshaw, Los Angeles, CA 90008.

ELECTRONIC CAR ALARM From West Germany automatically protects your car. Compact, easy installation: $29.95 postage paid. **DGD IMPORT,** 408 Winters Drive, North, Mastic, NY 11950.

SPLASH Guards For **VW BUGS** Without Running Boards. Front Mount-Rubber; Protects Lower Sides. $6.95 Pair PPD; 25¢ Literature. Haag's Karbel Haus, 7951 Allen, Hamburg, New York 14075.

PARTSEARCH (G.B.) Will Locate And Acquire That Elusive British Car Part. Details $2.50 Deductible. 77 Keyes Road, Dartford, Kent, England. **(AIRMAIL)**

NOW AVAILABLE—UNIQUE OIL FILTER! Guaranteed never needs replacement! Do it yourself in 5 minutes. Included is a written lifetime guarantee—Please include: Vehicle make, model, year & engine. $31.00 postpaid; CA residents add 6% Sales Tax. S. Rawles; 2633 Highland Ave., Box 4-D; Dept. PM-1, San Diego, CA. 92105.

AUTOMOTIVE Tools & Equipment Nationally Advertised Brands at Discounted Prices for Mechanics. Send Stamped Envelope for Current Specials. Associated Distributors, 401 Augusta St., Cincinnati, OH 45202.

ADD An Iglit To Your Ignition. Q-ARC, Box 47876, Los Angeles, CA. 90047.

RECREATIONAL VEHICLES, PARTS & ACCESSORIES

RECREATIONAL Vehicles. Save! Increase Livability, Safety, Mileage. 75 page illustrated manual. Details from GINACO-M, Box 27744, Tempe, AZ 85282.

MINIBIKE, Lawnmower, Small Engine Replacement parts-accessories at discount prices. $1.00 for catalog—Refundable First Purchase. A.C. Products, P.O. Box 3413, Waco, Texas 76707.

FREE . . . FREE . . . FREE! Largest RV Accessories Catalog in U.S.A. Fredson Trailer Supply, Dept. 60A, 815 N. Harbor Blvd., Santa Ana, CA 92703.

MOBILE HOMES

BUYING A USED MOBILE HOME Tells when, where, and how. It could save you thousands of dollars. Money back guarantee. $3.00 Total. Roy Oswald, 4396 Waresferry Rd., Montgomery, Alabama 36109

SNOWMOBILES

MAKE YOUR OWN SNOWMOBILE. Propeller driven by a Continental aircraft engine. Drives over snow and ice. Becomes a "self contained" trailer in 15 min. when necessary to transport snowmobile over dry highways. Buy a photocopy of article as it appeared in P.M. for $1.25. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

MOTORCYCLES, BICYCLES, MOTORSCOOTERS, & SUPPLIES

MOTORIZE BICYCLES—PLANS!!!! Electric, $2.00 . . . Gasoline, $2.00 . . . Both, $3.00 . . . Guaranteed . . . Britt, 956 Springdale, Atlanta, Ga. 30306.

BICYCLE SUPPLIES Hi-performance oriented 129 pages, color catalog including framesets, tools, clothes, and "how to" advice for many custom installations. Top Rated by 3 major cycling magazines. **BIKECOLOGY BIKE SHOPS INC.,** P.O. Box 1880-PM, Santa Monica, CA 90406.

MOTORCYCLE. Mini-Bike Accessories Engines, parts. Wholesale to Anyone. Catalog $3.00 refundable. Donz Midget Motors, Mt. Ephraim, N.J. 08059

UNIVERSAL STEEL GAS TANK 2 Gallon Capacity Tapped in four Peer Locations, Loose Brackets and Gas Cap included. Adaptable to many applications. P.O. Box 3068, San Francisco, Calif. 94119

MOPED KITS Motorized Bicycles offer up to 200 Miles per Gallon and minimal maintenance. 23 States now have relaxed Moped laws. **SAVE** over $100.00 by assembling our parts. For details write: Stack Manufacturing Company, P.O. Box 26343, Minneapolis, Minnesota 55426.

GO-KART—Mini-bike plans. $2.00. P.O. Box 3084, Centerline, Mi. 48015.

ATV'S "Go-Carts" Mini-Bike. Plans $1.00 Each. Lorenco Parts, Danville, Illinois 61832.

FAST, Economical, Electric Minibike Plans: $3.00. Zeemcorp, 1446 Hutchinson, Chicago, Illinois 60613.

BICYCLE BUILT FOR TWO. Make your own Tandem. Get extra mileage out of a couple of stored bicycles. Photocopy of plans as they appeared in P.M. issue only $1.25. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

HANG GLIDING—AVIATION

HANG GLIDING Handbook. 200 Pages, $5.95 postpaid. Poynter, Box 4232-S, Santa Barbara, CA. 93103.

AIRBOAT Propellers, Engines, Hubs, Mounts, Supplies, Corvair, V-W Conversions. Removable Airdrives. Catalog $2.00. Banks-Maxwell, Box 3301E, Ft. Worth, Texas 76105.

BUILD A "FLYING VOLKSWAGEN!" The Teenie Two an all-metal plane. It's a challenging project made from materials and parts that are readily available in any metal-products shop. Package includes a booklet of instructions plus the plan sheets. Price $35.00. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City, Sta., New York, N.Y. 10019.

BUILD—Fly—Your Own Small **JET HELICOPTER!** Easy, Inexpensive. Detailed Plans, Drawings—$6.00. Helicraft, Box 7153, Baltimore, Maryland 21218.

CONVERT VW engine for aircraft use. I sell plans (32 pages, step-by-step instructions $7.00) and Vertex magneto (plugs into distributor hole.) BAC, Dept. MP, 78 E. Stewart. Lansdowne. 19050.

SPACE, ROCKETS, ASTRONAUTS

ANTIGRAVITY Propulsion Device. Free Brochure. **RDA,** Box 873NM, Concord, NC 28025.

HOVERCRAFT

FANTASTIC, 25 mph on 8 hp. Mower engine. Plans, $9.50. Free information. Palmer Aerosystems, Box 691, Renton, WA. 98055.

HOVERCRAFT Plans All Sizes Tested Designs Catalog $1.00. Universal Hovercraft, Box 281, Cordova, IL. 61242.

TWO MAN PLUS; Build Easily, Latest Design. Flies Over Land, Water, Snow. Fully Steerable. Uses Low Cost Mower, Snowmobile Engine. Complete Large Plans Package, Construction Book, $10.95. Foreign Add $1.00. Hover-Car II, P.O. Box 56P, Changewater, N.J. 07831.

AERO-CAR Amazing Hovercraft built easily with ordinary tools. Lawnmower engine power. Carries one man plus. Hovers, flies forward, backward. Sideways over Land/snow/water. Complete construction plans and brochure. $5.95. Aero-Projects, Box 5118PM, Clinton, New Jersey 08809.

BARTLETT FLYING SAUCER Ultra-Light Hovercraft Powered By Ordinary Lawn Mower Engine. Easy To Build Fun To Fly. Complete Plans, Photos, Supply Sources And Flight Instructions $3.00. Write: Herb Bartlett, P.O. Box 156-M, Silverdale, WA. 98383.

CB-RADIO, TV & HAM EQUIPMENT

GOVERNMENT Surplus receivers, transmitters, snooperscopes, parts. Catalog 25¢. Meshna, Nahant, Mass. 01908.

36¢ RADIO & TV Tubes. Free catalog. Cornell, 4213-17 University, San Diego, California 92105.

WHOLESALE, CB, Amateur, Marine, Scanners. List 25¢. Scanner crystals, $4.25. Enterprises, Box 461M, Clearfield, UT 84015.

LINEAR AMPLIFIER, 3-30 MHz, 100 watt mobile. Construction plans, $3.00. Wilson, Box 5516BB, Walnut Creek, CA. 94596.

CB SAFE-Stops CB Rip Off's. Free Information. Safe, 1722 Watson Blvd, Warner Robins, GA 31093

FREE Educational Electronics catalog. EduKits Workshop, Department 766B, Hewlett, New York 11557.

FREE CB or Money earned by selling just 50 Good Buddy Handle Emblems to friends and neighbors. Free Information. Creative Plastics, Holcombe, Wisc. 54745.

DELUXE CB carry cases. Write: Tomchuk, Box 420PM, Ansonia, Ct. 06401.

MAKE YOUR TV USEFUL. Turn it into a mind-challenging playground with video games. Tournament 2000, 6 games, in color with color TV, $120; Odyssey 400, 3 games, $100; Odyssey 300, 3 games, $70; Send check or money order to: P. Schneider, P.O. Box 13, Coeur d'Alene, Idaho 83814.

TV TROUBLES? Send us symptoms, model, make and $1.00 (refundable). Fast response. Tele-advisor, 4201 N. Kedzie, Chicago 60618.

OSCILLOSCOPE KIT. Assemble your own 5" scope. Combined simple instructions and operating manual included. Special price $69.95. Send check or M/O. Electronic Technical Institute, Little Falls, N.J. 07424 Dept. 2710.

ELECTRONICS

PLANS For 22 Electronic Kits you can build. Send $5.95 to: Graymark, 1751 McGaw, Irvine, CA 92714.

FREE! Police/Security-Investigative Schematics and Equipment Listings—Quimtronix, Box 548-PMO, Seattle, Washington 98111.

FLAT Marine, Hi-Fi, and Communications loudspeakers. ⅞" thin. Use indoors or outdoors. Mignon Marine Products, 10 Apache Trail, Ringwood, N.J. 07456.

DISCOUNTED C. B. RADIOS: Send $2.00 for Dealer Price Sheet, Catalog. **ESCO** C. B. Mart, Box 1167M, St. Joseph, Missouri 64503.

HIFI, TAPES, PHONOGRAPHS, RECORDS

FREE Catalog—Electronic Kits—Amplifiers—Preamplifiers—Psychedelic Strobes—SCA Adaptors—Color Organs—Digital Instruments—Guitar Amplifiers. **FREE** Subscriptions. SWTPC, Box PM32040, San Antonio, Texas 78284.

(Continued on next page)

"HIFI, TAPES, PHONOGRAPHS & RECORDS"

(Continued from preceding page)

RECORD-TAPES! Discounts to 73%; all labels; no purchase obligations; newsletter; discount dividend certificates; 100% guarantees. Free details. Discount Music Club, 650 Main St., Dept. 1-0277, New Rochelle, New York 10801.

OLDIES 45RPM Original Hits—Catalog 50¢. C&S Record Sales, Box 197, Wampsville, New York 13161.

OLD Radio Shows. Huge Catalogue $1.00! Box 9032-Z, Wyoming, Michigan 49509.

OLDIES 45rpm. Free catalog. Corny's Record Shop, Box 166RC, Mason, Ohio 45040.

OLD Radio Shows Cassettes—$1.10 Hour—List. Nostalgia, Box 3584, Simi-Valley, Calif. 93063.

MOTION PICTURES & SOUND EQUIPMENT

SUPER 8 & VIDEOCASSETTE ENTERTAINMENT FOR SALE OR RENT! 8 mm, 16 mm sales only. Write or call today! Free Catalogs! **CINEMA EIGHT,** Box PM, Chester, Ct., 06412. (203) 526-9513.

SUPER 8, 8mm, 16mm, 35mm, B&W and Color Film, Supplies, Processing Equipment. Send 25¢ for 84-page catalog refundable with order. Superior, 448 N. Wells, Chicago 60610.

BRAND NEW COLUMBIA PICTURES CATALOG. Classic Movies, Exciting Sports, Fantastic Cartoons, Old-Time Serials. All the Stars, Super 8, Sound or Silent. For free catalog write: Columbia Pictures 8mm Films, Dept. B, 711 Fifth Avenue, New York, NY 10022.

16MM SOUND Films, Features, Shorts, Bedner, 5300 So. Talman, Chicago 60632.

UNUSUAL Movie supplies. Free circular. Esor, 47th Holly, Kansas City, Missouri 64112.

SUPER 8, 16MM and 8MM Full-Length Features and Shorts, Sound and Silent, Color and Black/White Film Classics. Bogart, Popeye, Barrymore, Garbo, Chaplin, Bugs Bunny, Mansfield, Our Gang, Etc., Etc. Free Catalog. **NILES FILMS,** Box 1576PM, South Bend, Indiana 46634.

CAMPERS & TRAILER KITS—PLANS

SAVE! BUILD YOUR OWN RV. It's faster and easier than you think with Glen-L Kits—Plans—Full Size Patterns. Dozens of models include Campers—Trailers—5th Wheels—Motorhomes—Pickup Covers—Camping Trailers. Pictorial instructions especially for amateurs assure factory-like results you'll be proud of. Van Conversion Plans $5.00. Send $1.00 for illustrated details covering all models Plus RV Kits/Equipment catalog. Glen-L RV's, 9152PM Rosecrans, Bellflower, CA 90706.

BOATS, TRAILERS, AND KITS

BOAT KITS, HULL KITS, FRAME KITS, PLANS & PATTERNS. World's largest catalog, over 300 modern designs for the amateur in fiberglass, plywood, strip planking, steel, aluminum, cement from 7 to 70 feet. **SAIL**-Prams, Day Sailers, Motor Sailers, Ocean Racers, Trimarans, Catamarans, **POWER**-Cruisers, Trawlers, Run-a-bouts, Fishing Boats, Kayaks, Inboard & Outboard Hydroplanes, Tunnel Boats. Also complete boatbuilding materials, sails, fiberglass, plywood, etc. Send $1.00 for catalog or $2.00 for catalog plus boatbuilding guide to: Clark Craft, 16-P, Aqua Lane, Tonawanda, New York 14150.

FIBERGLASS BUILDER'S MATERIALS, Lowest factory prices in cloth, mat, roving, resin, apoxy, foam, bronze, nails, plywood mahogany. Send $1.00 for literature or $2.00 for literature plus booklet on mold making and "How to" fiberglass. **CLARK CRAFT,** 16-P1 Aqua Lane, Tonawanda, New York 14150.

FOLDING KAYAK Plans $13.00. Build in your living room. Send $1.00 (Refundable) for information: F&S Enterprises, PO Box 02083, Portland, Oregon 97202

NEW 1976 Evinrudes . . . 6 $400 . . . 15 $588 . . . 35 $750 . . . 55 Electric $1150 . . . All Sizes . . . Scott-McCullough Parts . . . $1.00 Handling . . . Electra Marine, 610 Merrick Road, Lynbrook, New York 11563.

BOAT PLANS—FRAME KITS—FULL SIZE PATTERNS! Huge 128-page catalog. Sailboats — Catamarans — Inboards — Outboards — Jets — Cruisers— Runabouts — Sportfishing boats — Trawlers — Workboats — Houseboats — Pontoons — Hydroplanes — Tunnels — 8' to 49' including "One-Off" Fiberglass Designs! Easy, proven methods especially for amateurs inc ude step-by-step pictorial instructions. **BOATBUILDING SUPPLIES** — C-Flex — Airex — Fastenings — Fiberglass — Resin — Hardware — Rigging — Spars — Sails — Boat Trailer Plans — "How-To" books. Send $1 ($2 Canada) for catalog plus Free "Boatbuilding Supplies" brochure. Glen-L Marine, 9152 Dept. MP Rosecrans, Bellflower, CA 90706.

FIBERGLASS Canoes, Kayaks, and Duckboats. Many exciting models. Easily assembled kits. $69.95 up. Free Literature. Riverside Canoes, Box 5595AO, Riverside, Calif. 92507.

CANOES! Kayaks! Factory Direct Kits, from $40.00. Quality wood/canvas designs. Free literature. Sportscraft, Box 636-P, Allentown, N.J. 08501.

SAILBOATS: 16'-$1095; 21'-$1529; 26'-$2899. 24' Power Cruiser-$2649. Save $2000-$5000-more! 8 factory molded fiberglass models. Easy terms. Free Catalog. Luger, Dept. BC-77, 3800 West Highway 13, Burnsville, Minnesota 55337.

ROW With a sliding seat. Build your own boat from our plans or buy it—rowing assemblies and oars available. Martin Marine Company, Box 251P, Kittery Point, Maine 03905.

CANOES-KAYAKS-KITS-PLANS—Moulded fiberglass-wood-canvas-40 models-free catalog-Clarkcraft 163 Aqualane, Tonawanda, New York 14150.

CANOE, Kayak Kits—Wood Canvas, Molded Fiberglass —Free Catalog. Trailcraft, Inc., Box 60686, Concordia, Kansas 66901.

BOATBUILDERS The Chesapeake Academy. The **ONLY** Shipwrights Trade School in America can save you up to 50% on the cost of a Custom Boat, Wood or Glass. Call for Information 804-725-7820.

BUILD A HOUSE BOAT FOR LESS THAN $1000. It's a 25 footer with a graceful vee bow. Best of all, with its 8 Ft. beam it's trailerable. Plans $24.50. Send to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, NY 10019.

MARINE EQUIPMENT & SERVICES

MARINE Engines, conversions, parts, equipment. Catalog **FREE;** postage and handling 50¢! Stokes Marine Supply, Coldwater, Michigan 49036.

CONVERT Auto Engines To Marine With Econ-O-Power Conversion Kits. Catalog 50¢. Marine Engine Center, 568 E. Elizabeth Ave., Linden 4, N.J. 07036.

CAMPING EQUIPMENT & TENTS

BUILD PM'S 'BOONIE BUG' LOTS OF GO ON LITTLE GAS! Based on a VW bus chassis, this go-anywhere camper is equally at home on or off the road. Sleeps two adults with room to spare for one or two youngsters. You can make it from PM plans. To order send $14.95 to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

ATHLETIC & BODY BUILDING COURSES

POWERFUL Muscles Fast!! Free Book. Universal Bodybuilding, Box 485A, Dearborn, Michigan 48121.

INCREASE Your pushup power. Dynamic training technique of new world pushup champion. $2.00. Champion, Box 19130, Minneapolis, Minnesota 55419.

DELTOID DEVELOPER You Make, Plans, $3.00. Kay Drafting, Box 24366, Edina, Minn. 55436.

ARMS, 18 + INCHES IN 90 DAYS Or Refund!! Revolutionary Arms Specialization. $3.00—Complete!! (Karate —Free information) Phenoministics, Box 281D, Gresham, Oregon 97030.

POWERFUL Muscles Fast! Guaranteed! Inquire: Goliath Enterprises, Box 933F, Wheeling, Illinois 60090.

SPORTING GOODS & EQUIPMENT

HUGE Sportsmans Catalog low direct factory prices, fishing, Hunting, Archery, reloading, Camping. Send $1.00 Refundable. Herters Inc., Dept. CPM, Waseca, Minn. 56093.

ARCHERY Lowest Discount Prices. All top brands. Orders shipped same day received. Money-back guarantee. World's Largest Supplier. Free catalog. Anderson Archery Corporation, Grand Ledge, Michigan 48837.

FISHING, TACKLE, LURES

FISHERMEN: Catch more fish. Get Mepps 1977 Fisherman's Guide. Loaded: Pictures, how-to, New Mepps. Send 25¢ to: Sheldons', Inc., Box PM, Antigo, WI 54409.

BRASS Eyelets for sinker molds. Ed Hain, Box 163, Cleona, Pa. 17042.

INJECTION Mold plastic worms Fast-Fun-Easy. Tons of quality fishing products too! Send $1.00 you'll get $1.50 in baits plus catalog. Super-Sport, 422 N. Varney Street, Burbank, Ca. 91502.

HUNTING, GUNS, DECOYS

PELLET GUNS and accessories. Sensible, enjoyable shooting anywhere. Finest adult models; satisfaction guaranteed. Free catalog. Write Air Rifle Headquarters, Grantsville, WV 26147.

GUN CABINET SHOWCASE PLAN. Holds up to six guns. Has storage for ammunition, scopes and cleaning gears. Sliding doors with lock. Photocopy of article $1.00. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

WORLD'S LARGEST SUPPLIER OF GUN PARTS Offers a 150 Page Catalog. Send $2.00 to: Numrich Arms, Box PM, West Hurley, N.Y. 12491.

DOGS AND KENNELS

INSULATED DOG HOUSE PLAN. Floor slides out for easy cleaning. Roof is water proof. Photocopy of plan as it appeared in P.M. available for 50¢. Send order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

ELECTRICAL SUPPLIES

ELECTRIC motor supplies! Equipment plans! Model-

BATTERIES, GENERATORS

BATTERY Trouble? VX-6 battery treatment **GUARANTEES** lifetime battery use. $3.98. Ely, 830 SW 14th St., Pompano Beach, Fla. 33060.

BATTERY Reconditioning Kit, includes molds, material, instructions. Apex Engineering, 3100 Ramona, Atascadero, California 93422.

CADMIUM Battery Additive. Guaranteed. Free details. Richard Zygmont, 400 Davisville Road, Willow Grove, Pa. 19090

ENGINES, MOTORS, MAGNETS

WINDING Lesson, A.C.-D.C. Armatures, $3.50. Data Company, 512 Kensington, Kansas City, Mo. 64124.

RUN Three Phase Motors on Single Phase! Three Methods! New Illustrated Manual. $3.00 Guaranteed! Lindsay, Box 12X, Bradley, IL 60915.

REWIND Car Generator for 110 VAC. Power Plant Plans $3.00. Schmauss, 1228 East Cass, Tampa 33602.

REWIRE Car Alternator for 110 AC. Plans $3.00. Sweatt, Box 12, Mims, Florida 32754.

TOOLS FOR SALE

S-K Tools—Wholesale Prices!!! Wrenches, Sockets. Lifetime Guarantee! 48 Page Catalog—50¢. Pioneer, Stanwood, Michigan 49346.

MACHINERY, TOOLS, & SUPPLIES

SANDBLAST CABINET. Industrial or home size. **INEXPENSIVE. E-Z BUILD** Plans & Instr. Send $4.50 + 50¢ Pstg & Hndlg. E.H. Hayden, 12560 Haster St., Space 123, Garden Grove, Calif. 92640

STAINLESS STEEL Washers, Bolts, Nuts. Sizes #0 to 2" Diameter. Free, 10 page, Illustrated Price List. Fastening Products, Box #151H, Cheltenham, Pa. 19012.

V-BELTS, Pulleys, Sprockets, Chains, Gears, Clutches. Thousands of power Transmission items. Large catalog $2.00 refundable with order. **GLOBE,** 370 Commerce, Ft. Washington, Pa. 19034.

MACHINIST Pocket trigonometry tables. 8 basic formulae—$1.50. Box 573, Newhall, Calif. 91322.

1600 American and Foreign catalogs listed and described. $2.00. **MASTERLOG,** Box 24413, Oakland, CA 94623.

PLANS, Pipe Bender, Break, Press. Info. 50¢. P.O. Box 56, Campo, Ca. 92006.

SMALL FOUNDRY furnaces. Supplies. Free literature. Pyramid Products, 3736 South 7th Avenue, Phoenix, Arizona 85041.

MILLING Cutters, lathe milling attachments. Catalog $1.00: Potter, Box 73, Cedar Rapids, Iowa 52406.

LATHES—Unimat, Maximat, Sherline. Metals-Micrometers. Catalog $1.00. Campbell, 1424 Barclay, Springfield, Ohio 45505.

BANDSAW BLADES. Any Size. Free catalog. Parker, R4, BX735, Sonora, Cal. 95370.

DISCOUNTS, Nuts, Bolts, Screws, Washers, Assortments. Catalog. 75¢. Nutty Co., 135 Main, Derby, Conn. 06418.

SHARPEN Saws, Tools @ and Pricing Guide. Information $1.00. Refundable. B&G Crafts, Box 215, Raymore, MO. 64083.

DRILLPRESS—Under $5—Send $2: Plans-C, Box 8851, Rochester, New York 14624

CLASSIFIED Special SK =4224 ¼", ⅜" Socket Set, reg. $35.98. Send only $24.50 per set. Immediate delivery! Limited Quantity! Herrema Tool Brokers, Box 103, Hudsonville, Mich. 49426.

CONVERT Jigsaw to versatile tablesaw. Ingenious plan $1. HomingCraft, Box 4484-B2, Santa Clara, CA 95050.

SCROLL Saw Blades, 2¾" pin end, for Dremel, $2.50 doz. Protex-M, 1724 Ocean Ave., Brooklyn, NY 11230.

4" METAL Cutting Lathe. $54.65. Taig, 15048 Proctor, Industry, Calif. 91746.

BLACKSMITH SUPPLIES

COAL Forges (or gas)—anvils, anvil benches, hammers, tongs, all blacksmith supplies. Order your Mankel catalog—$1.00—refunded on first order. Mankel Blacksmith Shop, 7836 Cannonsburg Road, Cannonsburg, Michigan 49317.

WELDING, SOLDERING, PLATING

GOOSENECK TRAILER. Can You Weld? Build your own Flat-Bed or stock Trailer from mobile home or truck frames. Simple blueprints and color photos. Mail $4.95, check or money order to: Kan Su Mfg. Co., Box 64, Columbus, Kansas 66725

ARC WELDING BASICS YOU CAN MASTER IN SIX HOURS. Tells you how! Includes four projects to get you started. Photocopy of article as it appeared in P.M. available for $1.75. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

SOLAR & ALTERNATE ENERGY

LARGEST SOLAR ENERGY/ENERGY CONSERVATION BOOK WAREHOUSE IN AMERICA! From do-it-yourself to advanced. Rush $2.00 (for catalogue) to: International Compendium, Dept. PM1, 10762 Tucker, Beltsville, MD. 20705.

Материал, защищенный авторским правом

SOLAR & ALTERNATE ENERGY
(Continued from preceding page)

FIREPLACES, Cast Iron. Free catalog. Homestead, Star Route, Box 275, Ramona, Calif. 92065.

HOW TO CUT COSTLY HEATING BILLS 50% Install new high-efficiency 4' x 8' ground level solar heating panels for under $25. No wiring, plumbing or metal. Illustrated plans just $6. Available only from Astro Magnetics Laboratories, 457 Santa Anna Drive, Palm Springs, Florida 33461.

SOLAR Catalog, 200+ Sunpowered items, Knicknacks. Books to Heating Systems. $2.00. Solar Economics, FrenchTown, N.J. 08825.

SOLAR WATER HEATER—Installing a system that heats water with the energy from the sun is no more difficult than installing a conventional-type water heater that uses gas or electricity. You can do it! Photocopy of Popular Mechanics article available for 85¢. Send order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, NY 10019.

HOME CRAFTSMAN

WOOD—Domestic and Imported Hardwoods! 4000 Items! Clock, musical instrument kits. Tools . . . discount prices! Hard-to-find hardware. 144 page catalog, 50¢. Craftsman, Dept. AX-27, 2729 Mary, Chicago, Illinois 60608

YOUR HOME WORKSHOP can earn you $200.00 each weekend. Enroll with **HOMECRAFT CLUB LTD.** and receive your enrollment certificate, and catalog of **HOMECRAFT** designs. Enrollment fee $1.00. **HOMECRAFT CLUB LTD.,** Box 9082, Edmonton, Alberta, Canada T5P 4K1.

CABINETMAKING MADE EASY And "How to Make Formica Counter Tops." Two excellent guides let you build kitchen cabinets and counter tops like professionals. Extraordinary guides b ing master craftsmen's shortcut methods. Satisfaction guaranteed. Write: Japs, 126-P Seventh North, Hopkins, Minn. 55343.

PICTURE Framing—Profitable full or spare-time business. Easy to learn with handbook-course "Guide To Picture Framing Profits." $3.00 Guaranteed. Free framing-supplies catalog included. Japs, 126-PM Seventh North, Hopkins, Minnesota 55343.

CATALOG FULL-SIZE FURNITURE PLANS—$1.00. Refunded with first order. Traditional, Early American, over 150! Furniture Designs, 1425 Sherman, Dept. CP-77, Evanston, Illinois 60201.

"PIPE CRAFTING". Thorough book $5.20 ppd. Choice materials for pipes, list free. Pimo P27, Box 59211, Chicago, Illinois 60659.

WOODWORKERS. Send stamp for monthly "specials." Hardwoods, RR #4, Box 133, Angola, Indiana 46703.

WOODEN TOY PLANS CATALOG. 75 Designs, books, supplies. 50¢. Love-Built Toys, Box 769-PM2, Antioch, California 94509.

GET PROFESSIONAL RESULTS with Brazco's Woodworking Books and Plans. Latest List, 25¢. Brazco, 2900-A Binyon, Fort Worth, TX 76133.

HOW To Create Beautifully Veneered Furniture Quickly, Easily! Illustrated Veneering Manual/Catalog **FREE,** Exotic Veneers, Inlays, Supplies. Morgan PO1K44, 915 East Kentucky, Louisville, Kentucky 40204.

EARN EXTRA INCOME! Scrap materials make beautiful inlay picture frames. Illustrated Plans $3.00. Keeney, 1504 Ashley Drive, Virginia Beach, Va. 23454.

BUILD Your own full size foosball table for party and family fun. Free brochure about parts and plans kit. Crocker Soccer, Box 556, Littleton, Colorado 80160.

FREE Woodworking plans for simple, profitable items. Send 25¢ for postage. Inprint, Box 687, Farmingdale, N.J. 07727.

101 PATTERNS, Gifts, Novelties, Action Windmills, plus "Make Money Jig Sawing". Only $3.00 Prepaid 1st Class. Mastercraft, 25M, P.O. Box 631, Park Ridge, ILL. 60068.

"WOODWORKING Profits." Tips on Starting Your Own Business: $2.00. Larson, Box 365, Hayward, Minnesota 56043.

CONVERT Jigsaw to versatile tablesaw. Ingenious plan $1. HomingCraft, Box 4484-A2, Santa Clara, Calif. 95050.

HYDROPONIC Plant Stand and Greenhouse Plans $4.00 each—Plus 50¢ Postage and Handling. **HARR PLANS,** 917 Scenic Dr., Felton, California 95018.

100 JIG SAW PATTERNS Full size toys, animals, bird houses, novelties, etc. $2.00 postpaid. Hayes Patterns, 6 Willow St., Woburn, Mass. 01801.

PM'S PLATFORM BEDS—Make your own! Take your pick of a king-sized platform with movable end tables or an economy, easy-to-build single sleeper. Full set of working drawings of both beds, plus a six-page instruction booklet with how-to photographs and construction tips available for $7.95. Send order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, NY 10019.

POOL TABLE Plans and Kits. Free Brochure. Tiercraft, P.O. Box 8151, Erie, Pa. 16505.

CONSTRUCTION PLANS, BLUEPRINTS

STEEL Hull boat plans 37' to 75' 88¢ a foot. For 32 pictures of building a 55' steel hull start to finish $5.00 deductible on purchase. Toler, 4928P, Galveston, Texas 77550.

BLUEPRINTS—Lowcost energy saving home $4.00. Graph-Tech, Rt. #1, Marengo, Ohio 43334.

LOG CABINS AND "A" FRAMES

WOOD STOVES HOLDS FIRE OVERNIGHT 80 Pg. Catalog $1.00 The Liter Knot, Box 1881, Hickory, N.C. 28601 (704)256-2193

"A" FRAME CABIN. 1184 Square feet: $2400. material. Purchase locally. Complete plans, instruction manual, material list, all for $5.00. Moneyback guarantee. Plan #4916. "Dependable Products". Box 113, Vista, California 92083.

BUILD Log Cabins, Rustic Furniture, Fireplaces!!! Complete Manual, $3.00. "A" Frame Plans, $2.00 . . . Housebuilder's Carpentry Handbook, $5.00 . . . Guaranteed . . . Beels, 956 Springdale, Atlanta, Georgia 30306.

LOG CABIN plans, detailed instructions: $3.50. Moneyback guarantee. "Reliable Products," Box 597, San Marcos, California 92069.

ONLY 75 Lucky Home owners will have one of our custom log homes in 1977! Send $3.50 for Custom Design Kit. Green Mountain Cabins, Box 190PM, Chester, Vermont 05143

NATURAL STONE HOUSE. Gather rocks free, build in one summer! Need pickup, hand tools—no experience! Illustrated "House Of Stone" manual, $3 (Guaranteed). Stonehouse 240, Sweet, Idaho 83670.

VACATION HOME PLANS

WOOD Shelter **PLANS** and **KITS.** Brochure $1.00. AGI, Merchants Plaza, Bangor, Maine 04401.

HOME BUILDING & REMODELING

POPULAR MECHANICS COMPLETE MANUAL OF HOME REPAIR AND IMPROVEMENT. 480 pgs. Here in one big volume is everything you need to know to keep a home in A-one shape. Indexed and cross-referenced for instant answers, 1,000 illus., charts, etc. Price $8.95. Send order to: Popular Mechanics, Dept. HE, Box 1575, Radio City Sta., New York, N.Y. 10019.

BUILD Home For 40% Off . . . No experience necessary . . Using smart shopping tactics, subcontractors, and cost cutting techniques, I've outlined, I built a house in 6 months . . spare time . . at 39.7% savings . . Send $1 for details . . or $7.95 now for easy, complete, 50p. "How To" guide. "10 day moneyback guarantee". Consumer Press, Dept. PM2, R#1, Mt. Sterling, Ky. 40353

PLASTICS

CASTOLITE pours like water, hardens like glass without heat. Crystal clear, colors. Embed flowers, seashells, mementos, anything. Make fine gifts. Reproduce your designs with flexible molds any shape, size. Profitable. Illustrated Manual Catalog $1.00. **CASTOLITE,** Dept. 77B/PM, Woodstock, Il. 60098.

PLASTIC LAMINATES. How to work with! You can turn out elegant finished products just by using hand or power tools. Resurface kitchen countertops. Correct countertop bubbles. Shows you laminating tricks you should know about. Photocopy of PM articles. Price $1.80. Send order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

DO IT YOURSELF

BURGLAR ALARMS—Fun and Profit. Simple plans. $1.50. MTP, Box 4893, Santa Clara, CA 95054

FREE Catalog. **CANVAS** Repair, Grommet Kits, Down Clothing Kits, Canvas Products, Tents. Laacke & Joys, 1439 N. Water, Milwaukee, WI 53202.

SAVE Money, Energy. Inexpensive, guaranteed, shower flow control. Millions in use. **FREE** Details. Energy, Box 88-A, Richmond, Virginia 23205.

ELECTROPLATING. Complete amateur's textbook. All metals Electroplate metallic/nonmetallic items $7.00. Details free. Tropic, Box 95-P3, Palm Bay, Fla. 32905.

1600 American and Foreign catalogs listed and described $2.00. **MASTERLOG,** Box 24413, Oakland, CA 94623.

FREE CATALOG of Over 200 helpful items to turn "Rocks Into Gems", for pleasure or profit. Covington Engineering Corp., P.O. Box 35PM, Redlands, California 92373.

IF YOU Have the dough to buy a $200.00 workbench, buy it. If not, send $1.25 for our poor-mans workbench plan and build your own for less than $30.00. Full instructions and material list. Way-Mar, 58 Underhill Road, Scarsdale, N.Y. 10583.

ENERGY Saving Plans. Water Wheels. Windmills. Electric Cars, Home Power Plants, Free Info., plans list. Goodman Associates, 4 Berryville Pike, Summit Point, WV 25446.

200 HOW TO DO Books-free catalog. Sincere. Box 10422, Phoenix, Ariz. 85064.

PM'S FAMOUS MASTER SHOP GUIDE. One of the most important tools you'll ever own! Lays out everything you need to know about nails, screw, bolts drills, adhesives, lumber, masonry, plumbing and electrical work. 24 stand-up, hang-up, wipe-clean laminated pages. 56 charts plus a built-in ruler, protractor and compass. Solid value at $4.95 + 50¢ to cover postage + handling. PM Master Shop Guide, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

SUPER Handyman's Encyclopedia of Home Repair Hints: Better, Faster, Cheaper, Easier Ideas For House and Workshop! $9.00 Postpaid. Bookworks, Box 2426-B, Hollywood, California 90028

MIGHTY MINI PUMP, Self-Priming, 200 Gallons per Hour, Attach to Electric Hand Drill, 100's of uses. Postpaid Airmail $10. McCartney, Loch Naver, East Kilbride, 974 2DG, Scotland.

FIRE Alarm five rooms, less than $16. Plans for simple heat detector, sources, $2. A. Malmer, Box 153-M, Blue Island, ILL. 60406

FOOSBALL Table plans and parts (men, rods, handles, etc.) kit for full size table. Ideal school woodshop project. Free brochure. Crocker Soccer, Box 556, Littleton, Colorado 80160.

MEAT BAND SAW Plans $5 Refundable on Kits. Crest, Route 4M, Tomahawk, Wisc. 54487.

OVER-Due Accounts? No Fee Method. Free Brochure. Business Aides, 265 Read Avenue, Tuckahoe, New York 10707.

PIPESMOKERS—Vent your tobacco pipes and get immediate cooler milder smoking. **GUARANTEED.** Brochure 35¢, or complete instructions and tool $2.00 postpaid. Greteco, Box 3599, Jacksonville, Florida 32206.

ELECTRIC Windmills. Solarheating. Battery power Automobile conversion. Illustrated Instructions, $3.00 each. Homecraft, 2350 W-47-P, Denver, Colo. 80211.

SOLAR ENERGY IS FREE! Complete Plans for Home Heating System . . . $3.95. Box 4517, Tucson, Arizona 85717.

TELEPHONES, Equipment, all types including modular. Catalog 50¢. Box 1147B, San Diego, California 92112.

PUT WHEELS ON YOUR PICNIC TABLE—Avoid heavy lifting. Prevent hernia, back trouble, medical/hospital bills. Complete do-it-yourself kit with instructions. Only $29.95 ppd. (Ohio, add $1.35 tax). Order from **SLENCO,** Box 532 PM, Dayton, Ohio 45401.

ROOF Maintenance tips—Add years—Save! $2. Windacre, Box 267, R.D.3, Bath, Penna. 18014.

TRAMPOLINES Jumbo 6' x 12' Ground Level Kit. $129.00. Details Trampolines, 1367 Hwy. 138, Riverdale, Ga. 30296.

SOLAR Energy Handbook, 5th Edition, $9.00. Ficoabm, 2901S Wentworth, Milwaukee, Wis. 53207. Satisfaction Guaranteed.

REPRODUCTION MOLDS

MOLDS For Ornamental Concrete Products. Catalog 900 Fiberglass Molds $2.00. Plycrete Mold Co., Elk Rapids, Mich. 49629.

ARTS & CRAFTS

MAKE Figurines, plaques, lawn ornaments. Molds, plastercraft kits, liquid rubber. Sample and catalogue 25¢. Wooley Company, Box 29-B, Peoria, Illinois 61601.

WHERE To Buy Handicrafts Supplies—Directories—Retail—Wholesale edition $3.00 each. Handicrafts, 924 Winter St., Stamford, Conn. 06905.

GLASS BLOWING Kits—Make Glass Miniatures For Fun And Money. Free Details—Willis Glass, Box 3460H, Anaheim, California 92803.

MAKE Handbags, Purses, Billfolds, etc. Profitable Hobby. Leathercraft Guide Shows How. $3.95. MGM Crafts, Box 352, Yardville, NJ 08620

STAINED GLASS Catalog. Tools, Supplies, Books. Send 35¢. Saylescrafts, 171 Main Street, Nyack, N.Y. 10960.

FREE Details. Flexible Mold Making Secrets. Create Artistic Reproductions. Plaster, Cement. Hobby Or Business. Southerland, Dept. PM27, 2311 Connecticut, Dallas 75214.

LEATHERCRAFT Catalog. Tools, Leather, Dyes, Dressings. Saddle Stamps, Buckles, much more. Send 50¢ to MacPherson Bros., P.O. Box 395, San Francisco, Calif. 94109.

"GETTING Started in Stained Glass" 25¢. Whittemore, Box 2065Y, Hanover, Mass. 02339.

NOW AVAILABLE! "Practical Guide to Successful Selling through Craftshows", $1.00 complete. American Craftsman, 29C Cherokee, Rockaway, New Jersey 07866.

CARTOONING, COMMERCIAL ARTS, SHOWCARD & SIGN PAINTING

CARTOONING Clues—Composition, gags, sales $2.00 Red Hare, 19615 Lake, Cleveland, Ohio 44116

CARTOON For Money!! Free Book!! Success, Box 885A, Dearborn, Mich. 48121.

MODERN Cartooning taught by mail. Write for free brochure. Cartoonerama—Box 263A2, Branford, Conn. 06405.

HOW To Make Money in Commercial Art. Information Free. Box 1204PM2, Youngstown, Ohio 44501.

LEARN Cartooning at home. Write: Cartooning, Box 70690, Colorado Springs, CO. 80933.

LEARN Sign painting at home. Free Talent test. Ben Kerns, Box 812-PM, Greenville, S.C. 29601.

52 Cartoon lesson course, Cartoon tips, Both $5.00. Hartman, Box 30367, Lincoln, Nebraska 68503.

SIGN Painting—Easy method. Free Catalogue. Kaufmann Company, Centertown, Missouri 65023.

MODELS—CARS, SHIPS, TRAINS, PLANES, ETC.

SHIP And Yacht model fittings: Pine construction hull kits; blueprints. Send $1.00 for illustrated catalog. A.J. Fisher, Inc., 1002 Etowah Avenue, Royal Oak, Michigan 48067.

SHIP And Airplane model kits catalog 25¢. Scientific, Inc., 340 Snyder, Berkeley Heights, N.J. 07922.

MODEL Airplanes—Big 220 Page Catalog $1.50. Sig Company, Montezuma, Iowa 50171.

RADIO CONTROL Airplanes, Boats, Helicopters. Big Discount Catalog $3.00. Modelers Supply, Box 7185, Montgomery, AL 36107.

SHIP MODEL Kits, Plans. Fittings from our own Workshop. Big Illustrated Catalog: $1.00 (Refundable). Bluejacket Shipcrafters, 145-V Water Street South, Norwalk, Conn. 06854.

SHIP Model Kits, fittings, plans, books, tools engines, motors. 1977 illustrated catalog $1.00—"refundable with first order". James Bliss & Co., Dept. SM, Route 128, Dedham, Mass. 02026.

LIVE Steam powered backyard railroads! All sizes. Complete "bolt-together kits," and rough castings. Excellent drawings. 100 page catalog $2.00. Little Engines, Lomita, California 90717.

RARE Rotary engine model. Write: Sepake, Box 5314, Orchard Lake, Michigan 48033.

KITES, GAMES, PUZZLES, NOVELTIES

TWO-Headed Penny, $1.00 Two-Tailed Penny, $1.00: Both $1.50. P. G. Merrell, Box 68374, Oak Grove, Ore. 97222

UNIVERSITY Degrees (phony) shipped Immediately. Authentic Seal. State-2U2, Box 5222, Station F. Ottawa, Canada. K2C 3H5.

PLAY WINNING BACKGAMMON! Booklet reveals secrets. Ideal for **BEGINNERS-ADVANCED** players. $1.50. Robin Enterprises, 25D Franklin Greens, Somerset, N.J. 08873.

FREE 1977 FUN CATALOG. Unusual Gifts, Science Gadgets, Novelties, Magic, Jokes, Games. $.25 Postage & Handling. **FUN FACTORY INC.**, Dept. C-20, 117 Union St., Palisades Park, N.J. 07650.

MAGIC TRICKS, JOKES, VENTRILOQUISM

FREE! World's Leading Novelty Catalog. 1800 Funmakers, Jokes, Tricks, Science, Sports, Hobbies, Jewelry, Bargains. Johnson-Smith, C-4, Mt. Clemens, Mich 48043.

BE A MAGICIAN! Large Professional Catalog $1.00. Plus FREE Mystifying Magic Trick. Magic, Inc., 5082-A Lincoln, Chicago, Illinois 60625.

FREE Trick and Catalog 25¢. Magic & Fun, Box 1936-MP, New York, N.Y. 10017.

PROFESSIONAL Magic! Factory Direct to you. Giant Catalog—$1.00 (Refundable) Hank Lee's Magic Factory, Dept. PM2, 24 Lincoln Street, Boston, Massachusetts 02111.

PROFESSIONAL Magic. Giant Illustrated Catalog 25¢. Top Hat-A, Box 1669, Evanston, Illinois 60204.

VENTRILOQUISM! Guaranteed Instruction, Scripts, Puppets. Catalog 25¢. Maher, Box 420PM, Littleton, Colorado 80160.

TWO! Different Magic Catalogs 25¢. Miami Magic, 9734 Bird Road, Miami 33165.

FABULOUS MAGICS New 1976 Catalog 50¢. Our Specialty Orders Shipped Same Day. No Substitutes. Fabulous Magic, 3319 East Charleston, Las Vegas, Nevada 89104.

HUGE!! Completely New Photographed Illustrated Magic Catalog 25¢. Moore's Magic, International. Box 1405-J2, Plymouth, Michigan 48170.

600 ILLUSTRATIONS—92 Catalog Pages—Free Trick —50¢—Manhattan Magic, Box 334-M, NYC 10011.

MAGIC! Large combination professional and amateur catalog, 50¢, refundable. Order from old, reliable dealer. Fast service. Jeffries Magicland, Box 274-A, Dallas, Texas 75221.

FREE Gift certificate plus magic catalog! Imperial, Box 623P, Worcester, Massachusetts 01601.

HOBBIES & COLLECTIONS

STOCK Certificates—12 different $2.95. Hollins, Box 112, Springfield, VA. 22150

COLLECT Military Medals. List 50¢. Vernon, Box 387PM, Baldwin, N.Y. 11510.

COLLECTING Political Items? List 50¢. Campaign Americana, Box 275PM, Merrick, NY 11566.

CONFEDERATE 1864 $10.00 Note, $2.99. $1,000. War Bond $14.95. N.C., S.C., Alabama, Virginia Notes $2.49 each. 56 Page List; 50¢ (Free with Order). Criswell's, Citra, Fla. 32627.

MACRAMÉ Instruction Book $2.00. Macrame, 604 West Main, Marshalltown, Iowa 50158.

WW II GERMAN Military Medals! Japanese Samurai Swords. Fine Replicas. Catalog $1.00. Tyco Camping, Box 302, Vienna, Va. 22180.

COLLECT COINS FOR PROFIT! How to start. Where to sell. Lists of valuable coins. Check your change! Send $1.50 plus 50¢ postage to: Rolco, Dept. P, Box 1113, Corsicana, Texas 75110.

AQUARIUM SUPPLIES

BUILD YOUR OWN COFFEE-TABLE AQUARIUM. Photocopy of article as it appeared in PM available for $1.50. Send order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

DECALS, EMBLEMS, PATCHES

CUSTOM Embroidered Emblems From Your Design. Inexpensive, Minimum 10, Free Price List, Superior Emblem, 830 West Pine Street, Dept. H, Mount Airy, North Carolina 27030.

EMBLEMS Embroidered. Made to order from your design. Free catalog. Donalyn Creations, Box 247PM, Cliffside Park, N.J. 07010.

CUSTOM Designed Embroidered Emblems, Decals. Inexpensive. Free Catalog, details. Southern Emblem, Box 8PMB, Toast, North Carolina 27049.

"PUT GUTS BACK IN UNCLE SAM." Plastic bumper or window sticker with picture, full color. $2.00 postpaid. Moore, Box 343PM1, Bentonia, Mississippi 39040.

ANTIQUES, RELICS, INDIAN GOODS AND CURIOS

ORIGINAL Antique Telephones. Illus. 1976 Catalog 30¢. Telephone Co., Turtle Lake, Wisc. 54889.

INDIAN Relics. List free. Arrowheads, $5.00 doz. Folsom $10.00 each. C. Secrist, Deerfield, Mo. 64741.

SELLING 10,000 Indian Relics. Arrowheads, Knives, Spearheads, Scrapers, Etc. List Free. Lear's, Glenwood, Ark. 71943.

PARKING METERS Original Obsolete. For Literature: Meyers, 2222 South Broad, New Orleans, Louisiana 70125.

STAMP COLLECTING

YOURS FREE! 55 Valuable Red China old and new postage stamps previously banned to Americans by the U.S. Gov't. At last you can legally own them—you may never have another chance as supplies are strictly limited so act fast! This spectacular and genuine offer given to introduce Kenmore's sensational world-wide Stamps-On-Approval Service for **FREE** examination. Buy $2 or more and get valuable bonuses or buy nothing—return selections—cancel service anytime. In either case the 55 Red China stamps are yours to keep **FREE.** Send 10¢ for mailing to Kenmore. Milford CR-789, New Hampshire 03055.

FREE U.S. $1.00 Stamp. Older Issues, Commemoratives, Airmails, Virgin Islands, Others—Catalog Value over $5.00. U.S. Bargain Price List. All Free! Send 10¢ for mailing. Empire Stamp, Toronto, Ontario M4W 2M2.

FREE Worldwide packet. Penny approvals. Froehlich, Box 412A, Morton Grove, Illinois 60053.

FREE! BIG BARGAIN CATALOG—NEW EDITION Listing thousands of bargains including U.S. & B.N.A. stamps, packets, albums, accessories and supplies. Also, fine stamps from our approval service which you may return without purchases and cancel service at any time. Jamestown Stamp, Dept. E27PM, Jamestown, N.Y. 14701.

FREE STAMP CATALOG for serious collectors. A supermarket of values in albums and collectors' supplies, plus hundreds of world-wide money-saving country collections and used and unused U.S. stamps! You'll also receive the next 8 copies of our value-packed monthly mailings free. No approvals will be sent. Write for free Get-Acquainted catalog today! H. E. Harris, Dept. GM-14, Boston, Mass. 02117.

GIANT Collection—213 Stamps, All complete sets including Space sets, Famous Paintings, Olympics, Wild Animals, Exotic Birds, and many more exciting sets. This bargain from London-Yours for 10¢ in unused stamps! to introduce approval bargains. Broadway Approvals, Dept. TC, 50 Denmark Hill, London S.E. 5. England.

1500 Foreign $2.00; 5000 $4.00; 9000 $6.00. 5000 USA, contains airs, dues, regulars, 19th Century, older issues, commemoratives, etc. $4.00. 300 USA high values $2.00; 700 $4.00. No approvals. Meyers 5321 Fleming, Richmond, CA 94804.

TOPS! 100 Popular Poland Stamps (all different) only 25¢. Mystic, Dept. PS 1, Camden, New York 13316.

ONE STAMP FROM EVERY COUNTRY in the world! Even veteran collectors want this collection—one stamp from every present-day stamp-issuing country. They're all here, from Afars & Issas and Afghanistan through Yemen People's Republic and Zambia—229 stamps, 229 countries. Only $2.95 with Harris approvals: exciting stamps to examine free, buy any or none, return balance, cancel service anytime. Free 40-page catalog! Send $2.95 today! Harris, Dept. T-54, Boston, Mass. 02117.

U.S. Stamps. Private clearance surplus collection. Free list. Smith, Box 36086, Grosse Pointe, Michigan 48236

INVEST NOW For Future Profits—**NEW** Report giving stamp investing tips. Rush $3.00 now! Wertmans, 44 Dan Avenue, Pittsfield, Mass. 01201

BRITISH STAMPS Old fashioned prices. List free. Silverado, Box 2092, Napa, Calif. 94558

JIMMY CARTER INAUGURATION DAY Cover addressed any name your choice. One-day-only Washington postmark records historical event on lovely cacheted envelope. Only 60¢ **K.M. Walsh,** Box 308 **TUCKAHOE, NY** 10707

URUGUAY! 50 Different! 25¢. Approvals. Anish, 22 Quinley Waterford, CT. 06385.

100 Fascinating Turkey Stamps (all different) only 25¢. **ADULTS** only. Goliath Co., Dept. Y-1, Bethlehem, NH 03574.

SURPRISE With Bargain Approvals. 25¢. Sun Post Express, Box 4531, Clearwater, Florida 33518

WOW! 110 ALL DIFFERENT GERMANY 10¢. Commemoratives, Airmails, High values, Big Catalog, bargain lists. Also, fine stamps from our approval service, which you may return without purchases and cancel service at any time. Jamestown Stamp, Dept. A27PM, Jamestown, N.Y. 14701 %

CROATIA: 25 Different for 35¢. Plus approvals. Deuteronomy, Box 67442, Vancouver, Canada, V5W 3T5

SIX U.N. MINT SETS $1.00 Approvals. Garden Street, Box 244, Littlesilver, N.J. 07739

CANADA Olympics Mint, Only .25¢, Approvals. Rheaume, 91 Valois, Vimont, Que. Canada H7M 1A9.

50 DIFFERENT Pre-1945 United States. Including Commemoratives. Only 25¢ with profit-sharing approval. 25 United States Airmails, 75¢. Universal, Box 6D, Kenosha, Wisconsin 53141.

50 YEARS Old, fifteen different United States, over fifty years old—25¢ with approvals. Jaxon, Box C11-P, New Rochelle, New York 10804.

FREE, U.S. Mint Set. Approvals. Hildebrand, Box 5645, Redwood City, California 94063.

BREATHTAKING Beautiful, 50 different mint Monaco pictorials-commemoratives only $1.50 with mint complete set approvals. Pagoda, Box 132P, Sidney, Ohio 45365.

SINGLE STAMPS 2¢ and up. Mounted in books. **TRUST STAMP COMPANY,** P.O. Box 100-P, Jamaica, New York 11435.

100 BRITISH EMPIRE 10¢ with approvals. Gibson, Box 34, Lansdowne, PA. 19050.

500 DIFFERENT Stamps, $1.50. Smith, 508-A Brooks, College Station, Texas 77840.

FREE Surprise collection sent with approvals. Gould, 1784 Union, San Francisco 94123.

FREE Duplicate Exchange, 2¢ approvals. Belden, Box 4175, Dearborn, Michigan 48126.

U.S. Airmails, 25 Different, 50¢. Welsh, 2103 Runnymeade, Frederick, Maryland 21701.

FREE BARGAIN LISTS! U.S. Stamps, plates. Money Back Guarantee. Scotco, X4455-PM2, Hollywood, Fla. 33023.

SCARCE Guinea UN Airmails $2.25, catalog 25¢. Approvals. Stamphaus, Box 533, Salisbury, Mass. 01950.

STAMPS 2¢ Each Mounted Scott order. Smith, Box 5826, Ft. Lauderdale, Fla. 33310.

SEND Only 25¢ for collection 55 Different U.S. Stamps. Includes old issues, commemoratives, high value, airmails plus hard to get $1.00 stamp. Offer to **ADULTS** only. Send 25¢ to: Goliath Co., Dept. W-1, Bethlehem, NH 03574.

50 U.S. All for 25¢ handling. Also Approvals if requested. Globus Company, 276 Park Ave. So, New York, N.Y. 10010.

50 DIFFERENT Old U.S. Revenue Stamps $1.00. Winchester Stamps, Box 3592, Mansfield, Ohio 44907.

AMERICAN CREDO Set Free to Collectors requesting low priced Approvals from: Richard Thorne, 13317 Lydia Street, Silver Spring, Maryland 20906.

FREE! Beautiful Nudes Collection. Approvals, Banknotes. Summit, 1146A-49th, Brooklyn 11219.

AN Unusual U. S. Approval Service, Sherman, Box 15355G, Philadelphia, Pa. 19111.

PENNY! Approvals! Regardless catalogue! Kloster, 4164 52nd St., San Diego, Calif. 92105.

CANADA 75 Different 25¢. Approvals. Oroszky, Box 1, Sarnia, Ontario, Canada.

U.S. BARGAIN, 50 Different 25¢, with beautiful worldwide, approvals. Stamp Center, Kennebunk, Maine 04043.

100 OLD United States between 1861 and 1939. $1.00. Ed Roush, 423 Shepard, Mansfield, Ohio 44907.

APPROVALS By Country. Discounts. Premium. Gains, Box 788, Mattoon, Ill. 61938.

25 Train Stamps 20¢. Approvals. Ralph's, 1664 Murray, Forty Fort, Pa. 18704.

520 DIFFERENT Stamps $1.25. New Issues Approvals. Klondike, Harrisburg, Il. 62946.

50 U.S., 10¢. With approvals. Happy, Box 124, Springvale, ME 04083.

50¢ BRINGS You 100 pictorial plus worldwide approvals. Capt. Shaw's Stamps, Box 277, Ocean Park, Maine 04063.

CANADA Ten Late Commemoratives 10¢, Canadian Approvals. Harley Boardman, Little Valley, New York 14755.

"INVERTED ERROR"—Hammarskjold 15¢ with approvals. Belmont Stamps, Washington, D.C. 20015.

PAINTINGS—25 Different Masterpieces. 25¢, Approvals. Tarheel Philatelics, Siler City, North Carolina 27344.

U.S. MINT Specials! Flag Set complete $1.50. 1¢, 2¢, 3¢ Famous Americans (21 different) $1.50. Free List. Brooks, 2601 Avenue "U", Brooklyn, N.Y. 11229.

(Continued on next page)

STAMP COLLECTING
(Continued from preceding page)

UNITED STATES—10 Different Flag stamps 15¢. Approvals. Blachman, Box 147, Homecrest, Brooklyn, N.Y. 11229.

WORLDWIDE New Issues—Free Weekly illustrated Lists. Brooks, 2601N Avenue "U", Brooklyn, N.Y. 11229.

50 ARGENTINA—Different. 10¢. Approvals. Gobestamps, Box 690, Saco, Maine 04072.

100 Turkish Stamps 10¢. Approvals. Box 212, Dept. PM, New Hampton, N.Y. 10958.

FREE U.S. mints with approvals. Chapman, Box 487M, Galesburg, Michigan 49053.

99 Different Stamps and Valuable Set 20¢. Approvals, Peterson, 405 Empire Bldg., St. Paul, Minn. 55101.

VIETNAM 25 Different 10¢ approvals. Sam Chazen, Box 666, Delray Beach, Fl. 33444.

FREE Packet list. Write Twopence, P.O. Box 13153, Reno, Nevada 89507

FREE: 32 Page United States and United Nations Price List. Sheron, Box 610547C, North Miami, Fla. 33161.

50 SPORTS PICTORIALS 35¢. Approvals. Arbour, 3727 Downey Dale, Randallstown, MD. 21133.

BRITISH COLONIES, Mint Sets, Antigua Mail Transportation, Dominica Christmas, Qatar Oil from Sea, Grenada Space Plus China 1946 Banking Assembly and Bhutan UPU. All for 10¢ to introduce our stamp selections. Buy any or none. Cancel service at anytime. Mutual Stamp Service, Box 2709, Rancho Palos Verdes, Calif. 90274.

U.S. Approvals to adult collectors. Incomparable selections of fine or 'unfine' (budget priced) used, mint and plates. Low prices, great variety. Rivertown, Dept. 188P, Lowell, Mich. 49331.

FREE-Mammoth Collection, Scott's, Master Global Albums when You Buy Approvals. Bargain Stamps, Box 5345, Santa Ana, Cal. 92704.

100 Worldwide Stamps 35¢ To Approval Applicants. R.S. Kantanick, 15171 Endicott St., Phila., Pa. 19116.

SURPRISE COLLECTION! Exotic Mint British Colonials absolutely free with approvals. **VIKING,** Great Neck, NY 11021.

99 DIFFERENT Worldwide—25¢. Approvals. Solway-PM, B26346, Houston 77207.

ICELAND Collection. Twenty different, $1.00. Approvals. Sandell, 701 Sherwood, St. Paul, 55106

TEN Different nudes: 20¢. Approvals. Stamp Farm, 2MI, Oxford, Wi. 53952

FREE U.S. with worldwide approvals. Stamps Unlimited, Box 2295, Kalamazoo, Michigan 49003.

200 Different Turkey, Plus Approvals, $1.35. Fies, A6P, Thornville, Ohio 43076.

100 Different worldwide 10¢. Colorful, fascinating. Attractive, **SPECIAL** approvals. Buy some or none. Bonus coupons enclosed. Tempo, Box 1538, Edminton, Alberta, Canada. T5J 2M7.

U.S. Plate blocks, 6 different commemoratives $1.00! Approvals. Gordon Davison, Hillsboro, New Hampshire 03244.

CHEAP Charlie's Stamp Packet and bargain lists, 10¢. No approvals. Carson, Box 5404, Lawton, Oklahoma 73504.

U.S. 100 different, 10¢, approvals. Stamps, Box 385P, Midlothian, VA 23113.

FREE U.S. price lists. No approvals. Applied Concept, Box 17185, Dulles Airport, Washington, DC 20041.

U.S. COMMEMORATIVES. Mint: 50, 100, 150 Diff., $3.00, $5.50, $8.00. Used: 50, 100, 150 Diff., $1.50, $2.50, $3.00. Free List, Gift. J&B Stamps, 338 N. Idaho Ave., N. Massapequa, N.Y. 11758.

FREE 25 Recent Animal And Topicals—Approvals included. Alpaughco, Box 225, Highbridge, N.J. 08829.

225 DIFFERENT Worldwide. 25¢. Approvals. Tibbets, 8675 Meadow, Downey, California 90242.

STEEL STAMPS. Multicolored paintings printed on USS steel foil. Mint set from Bhutan, 25¢. Topical approvals. LeBlanc, Box 110P5, Glen Cove, New York 11542.

"WHOLESALE" U.S.—Foreign Pricelist and catalog Free! Everything Guaranteed. Schneider, Box 1240, Grand Rapids, Michigan 49501. "We accept Master Charge."

FIRST Day Covers On Approvals. Dolores, Box 96PM, Coopersburg, PA 18036.

CANADA. 25 Different Commemoratives 25¢. Approvals. Wilson, Box 13, Ormstown, Quebec, JOS 1K0 Canada.

PERU Pictorial Collection Twentyfive cents asking approvals. Bustamp, Box 11, Blue Island, Illinois 60406.

SENSATIONAL Clearance Offer. Twenty Different Packets 50¢. Norge, Wyckoff, N.J. 07481.

WORLDWIDE Collection 125 interesting stamps 10¢ Approvals. Casto, Box 927, Largo, FL. 33540.

CANADA. 100 Different $1.50, 200. $3.00, 300. $8.50. commemoratives only: 75. $3.00, 150. $4.50, 200. $7.50, also Want List Service on mint, used or plate blocks. Galaxy, Box 426-P, Uptown Stn., Quebec City, Canada.

107 Different Triangles. Space, Sports, Paintings, Bicentennials and more. Plus "Mystery Gift". Only 10¢. Approvals. Jayto Stamps, East Syracuse, New York 13057.

RUSSIA! 100 Different All large commemoratives! Only $1.00 with approvals. Schmidt, 634-M Station A, Richmond, Calif. 94808.

FREE! Illustrated United States Price List. Global, Box 792-P, Livermore, California 94550.

COINS, TOKENS, CURRENCY

25 Old Mercury Head Dimes, $14.95. Coin House, Liberty Bank Building, Suite 108, St. Paul, Minn. 55104.

SEND 10¢ for New Edition valuable Guidebook **"HOW TO COLLECT COINS."** Also included, 5 foreign coins from Turkey, Spain, etc., and best Coins and Supplies Catalog in America. Littleton Coin Co., Dept. VB-1, Littleton, N.H. 03561.

SET Of Four Curious 8 and 12 sided, round and square shaped coins from Pakistan. Send only 10¢. Mystic Stamp Company, Dept. CM-1, Camden, New York 13316.

INDIAN Cent and Lists: 50¢. CCC, Box 251-P, Cornelius, Oregon 97113.

CASH For Your Coins. Send $2.00 For List. (Refundable) Silver Dollar, Dept. M, 1510 North Main, Cleburne, Texas 76031.

BRILLIANT Proof Sets—1957-1959-1960 Each $6.29; 1973S $12.89; 1974S $14.89; 1976S $15.89. Super-Bargain Lists 50¢. Bebee's Incorp., Omaha, 68111.

LIBERTY Nickel And Two Buffalos with Price List $1.00. Sego International, Box 787, New York, New York 10008.

20 DIFFERENT S Pennies, 1968 to 1974 B.U. Special $3.00. Jacks Coins, 1217C, Mehlert, Kingsburg, Calif. 93631.

BUFFALO Nickels Five Different $1.00. Bryson, 612M White, Toledo, Ohio 43605.

THREE Different Silver Dollars Lists $16.50. Park Coin, 4400 Excelsior Blvd., Minneapolis, Mn. 55416.

BINOCULARS, TELESCOPES, MICROSCOPES, MAGNIFIERS

FREE Binocular, Riflescope catalog. Discount sale. Save 50%. Free gift with order. Write: United Binoculars, BN-608, 9013 So. Western, Chicago 60620.

CAMERAS AND EQUIPMENT

FREE BARGAIN BOOK—Central Camera Co., Dept. 312, 230 S. Wabash Ave., Chicago, Ill. 60604.

PHOTO & PHOTO SUPPLIES

DARKROOM SINK WITH A BUILT-IN PRINT WASHER. Make it Yourself, it's Easy! For 75¢ you can buy a Photocopy of the Article as it appeared in PM. Send Orders To: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

PHOTO FINISHING

LOOK!—Special Money Saving Offer! Kodacolor Rolls developed with Jumbo Prints—12 Exposure $1.75, 20 Exposure $2.75, B&W 89¢ (postpaid). Big Supply Discount. Enclose advertisement. Wisconsin Film, Dept. E, La Crosse, Wisconsin 54601.

SELL Your Photos. Details $1.50 To: 5647 Pepperwood Ave., Lakewood, Calif. 90712.

COLOR SLIDES

GAF Colorslides. Worldwide catalog 50¢. Worldwide, 7427-M Washburn, Minneapolis, Minn. 55423

BOOKBINDING

REBIND YOUR DAMAGED BOOKS. With a few common tools and a homemade book press (plan included) you'll be able to handle anything from a torn hinge to a complete rebinding. Photocopy of article as it appeared in P.M. available for $1.75. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

BOOKS & PUBLICATIONS

CATALOG Hundreds of plans patterns and furniture designs for woodworking projects. Send 25¢. Craftplans Co., Rogers, Minn. 55374

FREE Book. Prophet Elijah Coming Before Christ. Megiddo Mission, Dept. 63, 481 Thurston Road, Rochester, N.Y. 14619.

WILDERNESS Living! Shelter, Food, Power, Medical, Self-defense, Military. Books—Vital, Fascinating, Extraordinary! Free catalog. Adobe Hacienda, RFD 3, Glendale, Arizona 85301.

CLOCK And watch repairing books, tools, materials. Free catalog. North American, Box 77 ABA, Fox River Grove, Illinois 60021.

BOOKS: Save 83%—Catalog. Franklin Book Company, B208, East Millstone, N.J. 08873.

NATIONAL Geographic Magazines, 1888-1977, any issue. Buxbaum, Box 465-PM, Wilmington, Delaware 19899.

"COMPLETE Book of Insults, Boasts & Riddles". $6.00 Postpaid. Bookworks, Box 2426-B, Hollywood, California 90028

YOU CAN RETIRE AT 40 AND LIVE IN COMFORT FOR THE REST OF YOUR LIFE. Many people work thirty or forty years always looking forward to the day when they can retire. Often they are sadly disappointed when retirement day comes, because they find they don't have the health nor finance to fulfill their dreams. Don't let this happen to you. You can retire while you are still in your prime, young enough and strong enough, plus have the finance to do all the things you have always wanted to do. Don't put it off for another day. Don't let the years continue to pass you by. Act now! It is later than you think! Let me show you how easy it is to plan and reach your retirement goal while you are still in your prime. By simply following the plan that I and many of my close friends have followed you can retire in a few years and do as we are doing, hunting, fishing, golfing, traveling and enjoying all the comforts of life. Send $9.95 plus .75¢ for postage and handling for this valuable booklet, Retiring At Forty. Send to: Cecil Mason, 900 Portland, Collinsville, Illinois 62234.

TRAVEL Newsletter-Quarterly. Best buys, tips, trips, fares. $7.50/yr. Free Tour Journal with order. "Departures", 24 Lewis, Hartford, Conn. 06103

FREE! Brochure Listing 300 "How-To" Books. The Mailbox, 1433-PM Faxon Pkwy., Williamsport, PA. 17701.

BUILD Your Own Telescope. Instructions $6.50. OBS, Box 13, New York, NY 10038

POWER OF YOUR SUBCONSCIOUS MIND $3.45 postpaid. Free Catalog of other helpful books. Research, Box 29604PM, Atlanta, Georgia 30359.

FREE Book Catalog directed toward your self development. Hundreds of titles to choose from, sports, business, hobbies, etc. Tradewinds, Box 305, Athens, Georgia 30601.

RARE Bookfinder: Vantrevren, 1950 Post #108PM, San Francisco, Calif. 94115. Send Wants.

SOLAR ENERGY DIGEST. Monthly Newsletter. Year, $28.50; Sample, $1.00. 7401-PM Salerno, San Diego, California 92111.

PLAYS, SONGS, MANUSCRIPTS

SONGS, Songpoems Wanted for Radio Show. Hollywood Music Productions, 6425-PM Hollywood Boulevard, Hollywood, California 90028.

LYRICS-Poems Wanted for musical setting, recording. Promotion available on selected songs. Fabulous $1,000.00 Offer. Monthly Awards. Talent, 17 (PM) Longwood, Quincy, Mass. 02169.

WANT Your book published? Learn how we publish, advertise, promote, distribute. All subjects. Free booklet PM. Vantage, 516 W. 34th Street, New York City 10001

POEMS, Songs. Your song or poem may earn you money. Free Examination. Columbine Records, 1611 Cherokee, (PM), Hollywood, Calif. 90028.

MUSIC INSTRUCTIONS & INSTRUMENTS

ACCORDIONS—Famous Makes. 32 Models. Importer-To-You Prices! Save On Cordovox And Button Models. Home Trial. Terms. Trade-Ins. Free Catalog. Accordion Corporation, Dept. R, 5535 Belmont, Chicago 60641.

EASY To play and make, quality dulcimers, banjos, thumb pianos, hammered dulcimers; instruments and kits. **HERE, INC. #P,** 29 SE Main St., Minneapolis, Minnesota 55414.

LEARN Banjo—5 string Bluegrass easy. No Music. Free details. Blaylock, Box 25N, Marietta, Georgia 30060.

PLAYER Piano Rolls, New, Discount Prices Catalog 25¢, refunded 1st order. Old Melody Den, 454 Freeport Road, Pittsburgh, Pa. 15238.

PIANOS, PLAYERS, PUMP ORGANS. Rebuild and repair. Catalog of "How-To" books, $1.00 (refundable). Vestal Press, Vestal 11, NY 13850.

INTERNATIONAL Catalog valuable to makers, repairers string instruments. Biggest variety parts, accessories, all imported woods, bows, kits. Send 25¢ and this ad for catalog, price list. We'll include certificate worth $1.25 credit on your first order of at least $10. International Violin Company, Dept. PP, 4026 W. Belvedere Ave., Baltimore, MD. 21215.

ELECTRIFY Player Pianos, Pump Organs Quickly, Inexpensively with Lee Silent Suction Units. Write: Lee Music, 525F Venezia Avenue, Venice, California 90291.

30 TO 60% DISCOUNT! Any Model: Guitar, Amp, Drum, Banjo, Dobro! Free Catalog! Warehouse P77, Box 11449, Fort Worth, Texas 76109.

GUITAR, Banjo, Violin, Mandolin making materials, accessories, books, piano tuning, Catalog 25¢. Guitar Center, Box 15444, Tulsa, Ok 74112

POEMS Wanted for songs. Nashville Music Productions, Box 40001-P, Nashville, Tennessee 37204.

POEMS Wanted. Publishing. Recording. Awards. Broadway Music, Box 7438PM, Sarasota, Fl. 33578.

KITS! Build dulcimers, guitars, harps, Banjos, mandolins. From $2.95. Finished instruments from $23.95. Free catalog. 8665 West 13th-PM, Denver, Colorado 80215.

(Continued on next page)

MUSIC INSTRUCTIONS & INSTRUMENTS

(Continued from preceding page)

ACCORDION Top Brands. Cordovox, Buy direct. Tremendous discounts. Trades accepted. Free brochure PM. Accordion-O-Rama, 874 Broadway, N.Y.C. 10003.

STRINGS! ALL KINDS! Accessories, Parts. Catalog 25¢. Stringking, M2, Box 5444, Lindenhill, Flushing, New York 11354.

GUITAR, Mandolin & Violin makers bending tools. Cast aluminum electric heated molds. Pamphlet 25¢. A. E. Overholtzer, 618 Orient St., Chico, Cal. 95926.

BAND INSTRUMENTS, DRUMS, GUITARS. 40% discounts available. Indicate instrument desired, Hamel Music Company, Box 184, Department A, Berrien Springs, MI 49103.

PIANISTS! Pro Piano Secrets, $3.50. Wolfebarn 66, Pt. Pleasant, Pa. 18950.

SONGWRITER'S Professional Service. Free Info. Wolfebarn 665, Pt. Pleasant, Pa. 18950.

FREE Lesson, "Learn Chording". Piano, organ, guitar. Davidsons, 6727PM Metcalf, Shawnee Mission, Kansas 66204.

LEARN GUITAR. New, easy, self-taught method. $3.98 ppd. Soralva International, P.O. Box 5-3834, Lafayette, La. 70505.

LEARN To play piano, organ or guitar the easy professional way. Professional Music, Box 86D, Brookfield, Conn. 06804.

EDUCATION & INSTRUCTIONS

WELDING TRAINING—Basic and Advanced for Major Processes—Arc (stick), **MIG, TIG,** Gas, Pipe all processes. A non-profit school. Accredited member **NATTS.** Approved Ohio 70-12-0064 HT. Write for school bulletin and course schedule. **HOBART SCHOOL OF WELDING TECHNOLOGY,** Box 77, Troy, OH 45373.

BE ALIVE AT LAST! Tap your true potential . . . for increased mindpower, easier relaxation. Rapid results assured. Full Details **FREE.** Life Dynamics, P.O. Box 418, Dept. DGT, 2935 Chillon Way, Laguna Beach, Calif. 92652.

FASTEST Piano Course In History! Uses patented system! Box 751-M, La Canada, CA. 91011

LEARN Sewing Machine Repairing. Men, Women. Lucrative profits. Profession with bright future. Gresslin Correspondence School, Box 927, Spencer, Iowa 51301.

ELECTRONICS DEGREE by correspondence. Free brochure. Grantham, 2004 Stoner, Los Angeles, California 90025.

DETECTIVE Course. Free Information. Universal Detectives, Box 8180-F, Universal City, California 91608.

SURVEYING PAYS BIG!!! United States Department of Labor reports "openings for 26,000 Surveyors in next ten years." Easy home-study plan guides you. Send for Free "Surveying Career Kit." North American School of Surveying, Dept. PBCC6, Newport Beach, California 92663.

PLAY ORGAN! Learn with inexpensive "professional" method. Write: Tino's Studio-PM, 4001 East Fanfol, Phoenix, Arizona 85028.

LEARN Flower Arranging and Floristry. Start business or hobby. Free information on home study course. Lifetime Career Schools, Dept. B-766, 2251 Barry Avenue, Los Angeles, California 90064.

RADIESTHESIA, Radionics, Dowsing, E.S.P. Courses and Equipment. Illustrated Catalog $1.00 (refundable) Established 27 years. Dept. PM/R Bruce Copen, Highfield, DaneHill, Sussex, England RH17 7EX.

DETECTIVE Profession. Easy home study; free tie-tack or lapel pin, certificate, future. Professional Investigators, Box 41345, Dept. CP, Los Angeles, Calif. 90041.

AUCTIONEERING, Resident or Home Study Course. Free Catalog. Nashville Auction School, 1921 West End, Nashville, Tennessee 37203.

AUTOSUGGESTION. Sleep-learning headquarters! Tapes, records, books. Gigantic catalog free. Research Association, Box 24PM, Olympia, Washington 98501.

LEARN Asleep or awake! Records, tapes, equipment! Free catalog! Drawer PM-400, Ruidoso, New Mexico 88345.

PASS Civil Service Examinations—Easily! Details. Arthur Alena, Box 173, Farmingville, New York 11738.

AUCTIONEERING: Mendenhall School of Auctioneering, High Point, N.C. 27263. Free information.

EXTENSION And Post-Graduate Awards in Philosophy, Art, Science, Botanic Medicine, Homeopathy, Radionics and others. 30 subjects. Curricular free (airmail $1.00 refundable). Registrar, Sussex College of Technology, Highfield, Danehill Sussex, England.

LEARN Auctioneering. Term soon. Free Catalog. Reisch World Wide College of Auctioneering, Inc., Box 949, Mason City, Iowa 50401.

OWN Collection agency. "Little Gold Mine!" Franklin Credit, Roanoke, Virginia 24004.

BURGLAR/FIRE ALARM EXPERTS NEEDED For cars, homes, industry. Learn high profit systems installation at home spare time. Simple, quick, complete. Free information by mail. No salesmen. Security Systems Management School (homestudy), Dept. 7310-027, Little Falls, N.J. 07424.

HIGH SCHOOL AT HOME in spare time. If you left school without finishing, write today for free brochure about our home study method, diploma, and accreditation. American School, Dept. BA-0245, Drexel at 58th, Chicago 60637.

PIANO Tuning quickly learned with home study course. Diploma granted. American Tuning School, 17050 Telfer Dr., Morgan Hill, California 95037.

DETECTIVE—Training Course. American Detective Institute, Box 418-A, Fairfield, Alabama 35064.

USED Courses! Books! List 15¢. Smith's, 124 Marlborough, Salem, Massachusetts 01970.

BOOKKEEPING OR ACCOUNTING! Your own business or work for others. Easy home-study plan prepares you quickly. Veteran-Approved. Free "Accounting Career Kit." Write: Accounting School, Dept. PBCC6, Newport, California 92663

ACCOUNTING Career. Only 20 lessons, $5. lesson. Send $5. first lesson. Jenkins, P.O. Box 571, Taft, Calif. 93268.

UNIVERSITY DEGREES BY MAIL Programs! Bachelors, Masters, Ph.D's . . . Free revealing details. Counseling, Box 317-PM2, Tustin, California 92680.

VETERINARY ASSISTANT. Send for free color brochure. Tells how you may train at home for exciting animal care career for just a few dollars a month. North American School of Animal Sciences, Dept. PBCC6, Newport Beach, California 92663.

MOTORCYCLE MECHANIC. Train at home spare time. Motorcycle tools, test instruments included. Write for facts: Dept. PBCC6, Motorcycle Repair School, Newport, California 92663.

ACTION IDEAS FOR SUCCESS Cassette tape series for sales, management and personal development. Send $1.00 for catalog, refundable. DMJ Enterprises, P.O. Box 306, Simpsonville, Md. 21150.

WATCH REPAIRING. Complete home training. Diploma awarded. Free sample lesson. Chicago School of Watchmaking, YO, Fox River Grove, Illinois 60021.

DEGREE Program in Electronics Engineering. Our 31st Year! Free Literature. Cook's Institute, Box 20345, Jackson, Miss. 39209.

SING Beautifully, Easily! Free Proof! Publishers, Box 118, Brooklyn, N.Y. 11203.

SPECIALIZED KNOWLEDGE in **CLOCK REPAIR** can make **YOU** a **SUCCESS.** No obligation. School of Professional Clocksmiths, P.O. Box 176 (PMEB), Frankston, TX. 75763.

INSTANT MEMORY . . . NEW WAY TO REMEMBER. No memorization. Release "photographic" memory. Forget nothing! Liberates extraordinary knowledge talents, ESP. Immediate results! Free information. Institute of Advanced Thinking, Box 606-PM, Pacific Palisades, California 90272.

FREE Book tells how you can learn camera repair and service. Home study or classroom. Write today! National Camera, Dept. EAD, Englewood, Colorado 80110.

DRAFTING—Blueprint Reading, Mechanical, Electronic, Architectural Home Courses $25.00. Send $2.00 first lesson, Prior Inc., 23-09 169th Street, Whitestone, New York City 11357.

LEGAL Investigation offers excitement! Work with trial lawyers. Fascinating, good-pay career. Learn at home, spare time. No college. No experience. Details Free. Universal Schools (homestudy), Dept. 11310-027, Little Falls, N.J. 07424.

LEARN THE SECRETS OF SUCCESS! Send for Free Brochure on "Magic Cassettes." Conomos, Box 5056P, Astoria, New York 11105.

REPAIR Sewing Machines, Profitable Trade, Easy to Learn. Free Details. Sewing Machine Center, 187 FR, Rochelle, GA. 31079.

WRITE BETTER REPORTS, Advance your career. **Free** details: Weber, 1102½ Forest, Lakewood, Ohio 44107.

PIANO Technology—Electronic organ servicing, learned easily at home. GI Approved. Free booklet. Niles Bryant School, Dept. P, 3631 Stockton, Sacramento, California 95820.

ANY Manual Typewriter; Carbon Ribbon Print Quality; 15 Mins. Plans $3.00. Paul Nornes, Suite 418, 152 W. 42nd St., N.Y.C. 10036.

UPHOLSTERY Decorating. Free Booklet. Learn at home. Upholstery Decorating School, Dept. 5310-027, Little Falls, N.J. 07424.

EMPLOYMENT INFORMATION

OVERSEAS EMPLOYMENT—Now Available Worldwide!!! All Occupations!! $12,000-$60,000 + Free Transportation!! Latest Printouts $2.00. Jobworld, 6311-PM Yucca, Los Angeles, California 90028.

OVERSEAS Jobs—now hiring! All Occupations! High Pay. Transportation. Computerized reports $2.00. Transworld, International Airport, Box 90802E, Los Angeles, CA 90009.

AUSTRALIA! 50,000 Jobs. Transportation. Information $2.00. Austco, Box 3623E, Long Beach, CA 90803.

OPPORTUNITIES In Fabulous Las Vegas. Report $3.00. Vegas Reports, P.O. Box 43141, Las Vegas, Nevada 89104

EMPLOYMENT Overseas—all occupations worldwide. Travel, tax benefits $3.00. Overseas, Box 1302, Edison, N.J. 08817.

TEXAS Jobs! Important "How-To" details, $2.00. Sunbelt Employment, Box 59104, Dallas, TX 75229.

FEDERAL JOBS $5,810.00 To $39,600.00 All occupations. How, where to apply. Moneyback guarantee. $3.00 to Opportunities Unlimited, Dept. A, P.O. Box 44307, Tacoma, WA 98444.

JOB Seeking Guide New . . How to get job . . entering, changing, termination. $5.95 . . information—stamp. Gary Himes, 1323 Doepp, Carlsbad, New Mexico 88220.

HELP WANTED

OVERSEAS Employment . . . $10,000-$50,000+. Free information! Employment International, Box 29217AB, Indianapolis, Indiana 46229.

AN OHIO OIL CO. offers **PLENTY OF MONEY** plus cash bonuses, fringe benefits to mature individual in your area. Regardless of experience, write: W. H. Read, Pres., American Lubricants Co., Box 696, Dayton, Ohio 45401.

FOR INVENTORS

INVENTORS: If you have an invention for sale or license, write for free booklet explaining how we can help you. Kessler Sales Corp., C-52-FI, Fremont, Ohio 43420.

INFORMATION WANTED . . . Regarding your personal experiences with registered patent attorneys and agents—and—your satisfaction or disappointment with their services and fees. We urgently need reliable information for survey purposes only. No commercial offer or solicitation of any kind will follow. Give a few minutes of your time to help improve conditions for your fellow inventors. Send names, dates and facts, but no valuable documents, Please! Write now to: Lans, Survey of Concerned Inventors, Box No. 3254, Vassar College, Poughkeepsie, New York 12601.

U.S. PATENT Office Searches, 234 Broadway, Room 3615, New York 10007. Free invention certificates.

PATENT Research, Engineering, Tax Assistance for Inventors. CDA, 300 Hollywood Avenue, Hillside, N.J. 07205.

INVENTORS—United States Patent Office Searches. Patent Development Engineering and Marketing of your Inventions, ideas with manufacturer contacts. Send for **FREE INVENTION CERTIFICATES** and Invention Information. Serving Inventors since 1948. George Spector, **LICENSED PROFESSIONAL ENGINEER**—Patent Engineer. Former **UNITED STATES PATENT OFFICE EXAMINER**—3615 Woolworth Building, New York 10007.

YOUR INVENTIONS/IDEAS-PATENTED OR UNPATENTED-EXPERTLY RESEARCHED, DEVELOPED, MARKETED FOR CASH/ROYALTY SALES. Professional, fee-based invention service company—second decade reliable service. Member: US Council International Chamber Of Commerce. Send for **FREE INVENTION RECORD FORM, PRODUCTION MARKETING BROCHURE,** "Your Invention—Its Protection, Development and Sale." Write: **THE IDEA PEOPLE, RAYMOND LEE ORGANIZATION,** 230 Park Avenue (A-113), New York City 10017.

NEED Help? Write our company, what can you lose? Pauley Engineering Sales, 45 Coral Drive, Belleville, Illinois 62221.

FREE PAMPHLET: "TIPS ON MARKETING YOUR INVENTION," from an experienced fee-based invention service company. Write: United State Inventors Service Company, Dept. P, 1435 G Street NW, Washington, DC 20005.

"HOW TO INVENT, PROFESSIONALLY." Profitable Booklet! $3.00. Tech Associates, 24 Cotton Avenue, Braintree, Mass. 02184.

WHY Pay Huge Agency Fees to Protect and market your Invention. Do It Yourself. Save Hundreds. Inventor's Helper, 3709 Atwell, Dallas, Texas 75209.

INVENTOR'S PARADISE—Combination Shows, Catalog Listing. **FREE DETAILS** To All Inquiries. Deadline Next Shows Soon. Paul Paulsen, Jr., 401 So. Columbia, Frankfort, Ind. 46041.

SEARCHES With Abstracts $16.00, with Commentary $24.00. "Filing Your Own Applications" $16.00. Professional Engineer, Box 8001 JFK., PO., Boston, Massachusetts 02114

SHOULD YOU PATENT YOUR INVENTION? For **FREE** U.S. Government prepared information on seeking qualified advice on invention protect on and development, and the names of **REGISTERED** patent attorneys and agents in your locality, write: **COMMISSIONER** of **PATENTS AND TRADEMARKS BOX 8B, WASHINGTON D. C.** 20231 Paid for by American Patent Law Association.

HOW TO SELL YOUR OWN INVENTION 136-page book tells everything about marketing and protecting your invention. Written by experienced inventor. Send $9.45 (California residents $10.00) or get free catalog. Halls of Ivy Press, Dept. PM, 13050 Raymer, North Hollywood, CA 91605.

INVENTED SOMETHING? What now? Do's and don'ts. Personal experience. $2.00. BCI, Box 1167, Killeen, Texas 76541.

INVENTIONS WANTED

LEARN How to offer your invention for sale or license. Free booklet outlines procedures, royalty rates, requirements. Kessler Sales Corporation, C-52-IW, Fremont, Ohio 43420.

HONGKONG Factory needs several new products every month to satisfy their oversea buyers. Particularly interested household items, toys, games, gadgets. Please send sketches or detailed explanation for evaluation and cash/royalty purchase. If you have an article/accessory cannot produce domestically because of quantity, price, or labour; please try us. Hongkong Plastic & Metal Products Company, P.O. Box 9627, Kwuntong, Hongkong.

INVENTORS: MANUFACTURERS NEED NEW PRODUCTS. FREE "RECOMMENDED PROCEDURE," by a creative fee-based invention service company. Washington Inventors Service, 422-F Washington Building, Washington, DC 20005.

INVENTIONS MARKETED Cash, Royalties **FREE INVENTION PROTECTION CERTIFICATES.** George Spector Manufacturers Representative, Woolworth Building, New York, N.Y. 10007.

FREE DIRECTORY OF 1001 CORPORATIONS SEEKING NEW PRODUCTS. Professional, fee-based invention service company. For important information on Protecting, Developing, Marketing your inventions/ideas for Cash/Royalty sales, write for **FREE INVENTORS KIT NO. A-84.** Raymond Lee Organization, 230 Park Avenue North, New York City 10017.

TOOL Inventor, manufacturer, seeking inventions. Percentage bases. Details $1.00. Turn-O-Carve, Box 8315, Tampa, Fla. 33674.

INVENTIONS-IDEAS WANTED. Developed, Marketed by leading professional organization for Cash/Royalty sales. **FREE EXAMINATION** and **CONFIDENTIAL REPORT** of the Commercial Features of Your Patented/Unpatented Invention. **FREE COPY** "How to Safeguard and Market Your Invention to Industry." Write: **LAWRENCE PESKA ASSOCIATES,** Dept. C, 500 Fifth Ave., N.Y.C. 10036 or call today (212) 391-6350. No Idea Is Too Small. Branch offices throughout the United States and Canada.

REAL ESTATE & FARMS

FREE! Big SPRING Edition! Over 5,400 new properties described, pictured—Land, Farms, Homes, Businesses—Recreation. Retirement. Selected Best thruout the U.S.! Over 700 Offices, 43 states Coast-to-Coast. Mailed FREE from the World's Largest! STROUT REALTY, Inc., 7-MX S. Dearborn, Chicago, IL 60603

CANADIAN LAND FROM $47.00 AN ACRE. Choice properties across Canada. Low monthly payments. Ideal for cottages, hunting, fishing, investment. Free catalogue. Canadian Estates Land, 286 Lawrence Avenue West, Toronto, Canada, M5M 3A8, Dept. PMC.

BIG . . . FREE . . . SPRING 1977 CATALOG! Over 2,600 top values coast to coast! **UNITED FARM AGENCY,** 612-PM West 47th, Kansas City, Mo. 64112.

"CANADIAN Country Properties." Our 61st Year. Free Catalogue. Tax Sale Service. Suite 404-PM, 85 Bloor Street East, Toronto, Ontario M4W 1B5.

GOVERNMENT LANDS . . . from $7.50 Acre! Homesites, farming, vacationing, investment opportunities! "Government Land Buyer's Guide" plus nationwide listings—$2.00. Surplus Lands, Box 19107-AY, Washington, DC 20036.

ARKANSAS Mountain and Valley Land, Farms, Homes. American Farm Realtors, 71 North, Mena, Ark. 71953.

WYOMING RANCH LAND. 10 Acres $30.00 down, $30.00 month. Owner-Mike Gauthier, 9550M Gallatin, Downey, Calif. 90240.

FREE CATALOG! (Covering 15 States)! All types property! Photos! **SAFE-BUY** Real Estate Agency, Inc., Box 589-PM, Little Rock, Ark. 72203.

TAX SALES. Pay delinquent taxes and they're yours. Fabulous opportunities in camp sites, farms, homesites. US & Canada. List mailed. 421-PM Center St., Lewiston, N.Y. 14092.

HOW TO FIND . . . Country land . . . **FREE** booklet . . . Grapevine Press, Box 1107PM, Fresno, CA. 93714.

SAVE COMMISSIONS On selling your property! Everything you need, written by agent! $3.00: P.O. Box 13402, Arlington, Texas 76013.

IDAHO Land. $1.25 acre. 320 acre parcels. Developable. Information only. Clark, 1364 Reed, San Diego, CAL. 92109.

CANADIAN ADVENTURER LAND. Hunting, all winter sports, fishing, airstrip. $10 down gives immediate possession. Carl Alford, 16 Bath Road, Kingston, Ontario. K7L 4x8.

20 ACRES Southwest Texas. Close to town & Rio Grande River. $3000 full price, $10 down, $30 monthly. Phone toll free: 1-800-854-4361. Owner.

100's Of low cost **VACATION LAND** and **SECOND HOME** opportunities in your area. Details, write: Sailwood, Dep't PM-1, Mears, MI 49436.

MANUFACTURING

INVENTORS Ideas Developed. Research. Models. Manufacturing. Sales. Free Brochure. Since 1942. William Parker, Box 6305, Orlando, Fla. 32803.

EXPORT—IMPORT

SAVE $200.00 a year importing your own products. Booklet tells how. Send $2.00 to M. Bohrer, P.O. Box 13197, Pittsburgh, Pa. 15243

NATURAL Flower Pictures 8x16" $42 Dozen. M. McDaniel, Claymont, Delaware 19703.

LEARN FABULOUS IMPORT-EXPORT BUSINESS—Report reveals how to get started, foreign suppliers. Ideal Export Items. Send $1.50 plus 50¢ postage to: Rolco, Dept. P, Box 1113, Corsicana, Texas 75110.

BUY IT WHOLESALE

REPLACEMENT PARTS to fit most current makes, models chain saws, lawnmowers, small engines. First quality. Substantial savings. Free catalog. Stores, shops give sales tax number for special dealer information. Repair Parts, Box 43073-K77, Middletown, Ky. 40243.

FREE WHOLESALE CATALOGUE Snowmobile, motorcycle. Small engine parts, Fiberglass Supplies. Mfg. Supply, Box 157-M, Dorchester, Wisc. 54425

PLASTIC BAGS WHOLESALE. 300 Sizes Stocked. List 25¢. Milvan, 7799P Enterprise, Newark, CA 94560.

HAVE Own Business. World's largest wholesalers. American, foreign. Bargains. Free details. International Buyers, Box 16386-M, Portland, Oregon 97233.

HEARING Aids, batteries. Wholesale. Catalog 25¢. Fiston, Box 1444, New Preston, Conn. 06777.

400,000 BARGAINS Below Wholesale: Many Free! Liquidations . . . Closeouts . . . Job Lots . . . Single Samples. Free Details. Bargainhunters Opportunities, Box 730-A, Holland, Michigan 49423.

WHOLESALE Jewelry, watches, sound equipment. Free catalog. Storekeepers only. Empire-PMW, 1916 Fifth, Sacramento, California 95814.

GENUINE Indian Jewelry Wholesale. Details $1.00 (Refundable). Langepm, 6031 North 7th Street, Phoenix, AZ 85014

BARGAINS Are Our Business. $2.00 Brings Wholesale Catalog. Alicia, Pelzer, SC 29669.

ADVERTISING AGENCIES, ADV. SERVICES, MAILING LISTS

ADVERTISE Free on TV, Radio, or Publications. Details From: Douglas Advertising, PM-2, 5088 Richmond, Buffalo, NY 14219

ADVERTISING Ratebook leading newspapers, magazines—$1.00. For mailorder business, salesmen, etc. Chicago Advertising Agency, 28-EM Jackson, Chicago 60604.

MAILING List. Most all kinds. $11.00 Per M, 500 Circulars mailed $7.50. Dixmailers, King, NC 27021.

MAILORDER ADVERTISERS!! CLASSIFIED ADVERTISING CAN BE MOST PROFITABLE AND REWARDING. PROBLEM IS TO KNOW WHAT TO DO, WHAT NOT TO DO. COLUMBIA CAN HELP YOU WITH YOUR MAILORDER PROGRAM. OVER 20 YEARS CLASSIFIED ADVERTISING EXPERIENCE, KNOWLEDGE OF BEST PULLING PUBLICATIONS, EXPERT COPY SERVICE IS ALL YOURS AT NO INCREASE OVER PUBLISHER'S STANDARD RATES. CHANCES ARE YOU WILL SAVE MONEY. WRITE TODAY FOR FREE DETAILS PLUS YOUR FREE COPY OF "MAILORDER ADVERTISER'S RATE GUIDE". COLUMBIA ADVERTISING AGENCY, BOX 1285B11, RICHMOND, INDIANA 47374.

RUBBER STAMPS

FREE Catalog of Rubber Stamps. Quality, Box 11094-D, Memphis, Tennessee 38111.

OFFICE SUPPLIES

MAILORDER RECORDS Help get increased business! Complete 32 Page Record Book shows your inquiries, orders, advertising, expense, etc. Only $1.00. **H. E. KAPPEL, POPULAR MECHANICS, DEPT. R, 224 WEST 57TH STREET, NEW YORK, N.Y. 10019.**

MULTIGRAPH, MIMEOGRAPH

NEED AN INEXPENSIVE COPY MACHINE. Make a dry printer yourself. Buy a photocopy of the plans as they appeared in P.M. Price 75¢. Send orders to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

TYPEWRITERS, DUPLICATORS, OFFICE EQUIPMENT

TYPEWRITERS—New SCM electrics & non-electrics near wholesale. 5 year guarantee your local SCM branch-list enclosed. Color catalog $1.00 refundable. ROECO, 4140 Washington Street, Roslindale, MA 02131.

PRINTING PRESSES, RUBBER STAMP OUTFITS

SIMPLE-X RUBBER STAMP PRESSES. Hydraulic operated electrically heated. Sizes 5" x 8", 8" x 12", 10" x 15". Starting outfits. Order for presses, supplies shipped day received. Send $2.00 for Catalog and Brochure. Custom Manufacturers, Box 211-P, Springfield, Mo. 65801.

PRINT YOUR OWN—Printing Presses, type, supplies direct from factory. Send 25¢ for catalog and samples to: Kelsey Co., DM, Meriden, Conn. 06450.

PRINTING MACHINES. Offset. Mimeograph. Typewriters, Composing. Machines, Dixgraph, King, North Carolina 27021.

RUBBER stamp outfits, supplies. Free catalog. Fast service. Jackson's Supply, Brownsville Rd., Mt. Vernon, Ill. 62864.

TYPE FONTS, Hand Printing Presses, Supplies. 120 pages. $1.00 deductible first order. Acme Type, 732 Federal, Chicago 60605.

SAME day shipment. Rubber stamp supplies. Wholesale price list. $1.00 deductible. Star Stamp Supply, 732 Federal, Chicago 60605.

PRINTING Presses, type, Supplies Lists, 20¢. Turnbaugh Service, Mechanicsburg, Pennsylvania 17055.

RUBBER Stamp Supplies; Starting Outfits. Catalog $1.00 Deductible. Martine, 1432 Major, Jefferson City, Mo. 65101.

FREE Catalog-Type. Rubber stamp supplies 20% discount on first order. Barco Type Mfg., 237 S. Evergreen, Bensenville, Ill. 60106.

PRINT it yourself for pennies. Electronic Stencil Printers $6.95 up. Free Print Sample. Inventec, Incorporated, Box 128-PM, Endicott, NY 13760.

PRINTING AND SUPPLIES

1000 EMBOSSED Business Cards $6.85 Postpaid. Agents Wanted. Elco, 181-A, Sylvania, Ohio 43560.

WHOLESALE. Office Supplies, Equipment, Printing. Agents Wanted. Atlantic, Box 1678PM2, Florence, South Carolina 29503

EMBOSSED Letterheads, Envelopes.—Inexpensive, Postpaid. Universal, 226E Myrtle, Scotch Plains, New Jersey 07076.

GUMMED LABELS

1,000 GUMMED ADDRESS LABELS $1.00. FREE LITERATURE, Acme, 1238 Voskamp, Pittsburgh, Pennsylvania 15212.

1000 Gummed address labels $1.00, Canada $1.35. Walt's, Box 960A, South Bend, Indiana 46624.

GIFT SHOPPING

FREE GIFT CATALOG Selective items—Hundreds to choose from. Western Shopping, Dept. PM2, P.O. Box 10192, Eugene, OR 97401.

USEFUL, Practical household gift catalog, free! Midwest, PM27, P.O. Box 1167, Iowa City, Iowa 52240.

CLOCKS, WATCHES, OLD GOLD, JEWELRY

HIGHEST CASH For Gold, Jewelry, Gold Teeth, Rings, Diamonds, Watches, Silver, Platinum. Mail Articles Today. Free gift with information. Chicago Gold & Precious Metals, 6 E. Monroe, Dept. 658, Chicago 60603.

NEED CASH? Highest immediately for old gold, silver, platinum, diamonds. Free Information. H & I Company, 79 Longview, White Plains, N.Y. 10605

CREATE A CLOCK! Movements, Hands, Dials—For Home Project. Free Literature! Stewart, Box H3, Hubbardston, Ma. 01452

HOBBYISTS! Jewelry making for fun, profit. Over 1000 wax patterns, castings. Catalogue $2.00. Great Western Jewelry, Dept. M, 2661 Louisiana N.E., Albuquerque, New Mex. 87110

WANTED—Gold, Silver, Platinum (any form). Pocket watches. Information free. Wilmot's, 345-D South Glassell, Orange, CA 92666.

HIGHEST CASH IMMEDIATELY FOR OLD GOLD, SILVER, PLATINUM, JEWELRY, GOLD TEETH, WATCHES, DIAMONDS, SPECTACLES. FREE INFORMATION. ROSE INDUSTRIES, 29-A EAST MADISON, CHICAGO 60602.

HIGHEST Cash For Gold, Jewelry, Watches, Rings, Gold Teeth, etc. Any condition. Satisfaction Guaranteed. Northwest Precious Metals, Dept. 1D2, Tununuk Place, Box 1801, Inuvik, N.W.T., Canada, XOE 0T0.

WATCH And Clock repairing books, tools, materials. Free Catalogs. North American, Box 77AB, Fox River Grove, Illinois 60021.

LED Watches, 1 year guarantee $19.95. PM Enterprises, Box 1438, Columbus, IN. 47201.

GOLD

FIND GOLD, Old Mines, Treasures, Pan Nuggets, Assay Gold Ore Amazing Guide Reveals How. **DETAILS FREE.** Dave Hunt, Roosevelt, Utah 84066.

ELECTROPLATING With gold and silver! Easy to follow instructions! Photocopy of article as it appeared in a past issue of Popular Mechanics available for $1.15. Send order to: PM, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

PRECIOUS STONES & MINERALS

ROCKHOUND Beginners Catalog. 50¢. Mineralore, 3004 Park Ave., San Bernardino, Calif. 92404

CUT Stones, jewelry mountings, belt buckles for silver dollars or stones, rockhound supplies Wholesale Catalog 25¢. Eloxite Corp., 810PM 10th St., Wheatland, WY 82201.

500 POLISHED Gemstones $5.00. Tumblecraft, 5401 James North, Minneapolis, Minn. 55430.

GET Free catalog no serious rockhound, gem cutter, jewelry maker, hobbyist or craftsman can be without. Full of bargains, exclusive items, low prices from largest suppliers and authorities in the field. Free new catalog just off the press, yours for the asking. Write: Grieger's, Dept. C-12, 900 South Arroyo Pkwy., Pasadena, California 91109.

TREASURE FINDERS

FIND Coins, jewelry, gold nuggets with new patented detector. Astounding range. Unaffected by concentrated black sand, mineralized ground. Rejects metallic trash. Free catalogue. Gardiner Electronics, Dept. 9, 4729 N. 7th Avenue, Phoenix, AZ 85013.

BURIED TREASURE—Locate up to Quarter Mile away with Ultra-Sensitive Directional Locator. Send for free, informative pamphlet. Research Products, Box 13441-AMC, Tampa, Florida 33611.

FIND Lost Treasure! Coins, Gold, All Metals. Many Models from $59.95. Free Catalog. Compass Metal Detectors, Dept. PBP7, Box 366, Forest Grove, OR. 97116.

FINEST Discriminating detectors; factory prices. Patented. Treasure Enthusiast, Rt. 1, Box 56MN, Benton, La. 71006.

TREASURE may lie beneath your feet! Discover gold, silver, coins, rings, artifacts and more with world-famous, deeper-detecting White's metal detectors. From $79.50. Dealers world-wide. Free literature! White's Electronics, Dept. PA7-C, 1011 Pleasant Valley Rd., Sweet Home, OR 97386.

RARE EARTH ELEMENTS. What they are. Why they are valuable. Where they are found. $2.00. Dept. PM2, Box 531, Montrose, CA. 91020

RECOVER LOST COINS, JEWELRY, Gold, Silver, Relics. D-Tex detectors reject trash, but find deeply buried treasures of all sizes. Free Literature. **D-TEX ELECTRONICS,** Box 451-U, Garland, Texas 75040.

TREASURE FINDER Locates buried gold, silver, coins, treasures. 6 powerful models. Instant financing available. Write or call for free catalog. Phone (713) 682-2728 day or night. Relco, Dept. AA21, Box 10839, Houston, Texas 77018.

PROFITABLE OCCUPATIONS

FT. SMITH Auction School, Ft. Smith, Ark. 72901. Resident & Home study. Veteran approved.

FREE Catalogs. Repair air conditioning refrigeration. Tools, supplies, full instructions. Doolin, 2016 Canton, Dallas, Texas 75201.

$100.00/DAY POSSIBLE!!!! Buy Scrap Gold . . . Easy . . . Complete manual, $4.00 Satisfaction Guaranteed . . . Brown, 956 Springdale, Atlanta, Ga. 30306.

BAKE New greaseless doughnuts in kitchen. Sell stores. Free recipes. Michael Ray, Waseca, Minn. 56093.

SHARPEN—Scissors, Pinkers. Light, compact equipment. Supplies. Blackhawk's, Sheldahl, Iowa 50243.

HOW To Make Money writing short paragraphs. Information free. Barrett, Dept. C-27-B, 6216 N. Clark, Chicago 60660.

GOOD Money Sketching Photos! Details: Gem, 365 Longhill, Shelton, Conn. 06484.

PLASTERCRAFT!!! Profitable home business. Molds available. Details: Lynnette, 6251C, Mentor Park, Mentor, Ohio 44060.

$200.00 Day possible. Must know electronics. Preliminaries $2.00. Box 809, Boynton Beach, Fla. 33435.

MAKE MONEY IN SPARE TIME. Earn generous commissions as a subscription sales represenative for leading magazines. For full details and instructions, send this ad with your name and address to: **POPULAR MECHANICS,** Room 1107M, 250 W. 55th St., New York, N.Y. 10019.

MAKE MONEY Writing Short Articles at Home. Booklet $1.50. FED Enterprises, 401 South 57 Terrace, Hollywood, Fla 33023

SELL YOUR PHOTOS—Report tells how and where. Color slide markets. Send $1.50 plus 50¢ postage to: Rolco, Dept. P, Box 1113, Corsicana, Texas 75110.

SALESMEN—DISTRIBUTORS

$100.00 extra a week easy! Spare time! Show men's, women's Double Air Cushion shoes. Dress, work, safety toe! Highest commissions. Shoes for yourself. Outfit Free. Bronson, Dept. HX-27, Minneapolis, Minnesota 55408

MEN-Women! Show new Hertel reference **Bible.** Astonishing 3-dimension Nativity cover. Fully referenced scripture text commands instant attention. Top commission, bonus. Liberal credit plan! No investment. Demonstrator furnished. Write International Book, Dept. PM, Box 118, Wichita, Kansas 67201.

SELL CALENDARS, SPECIALTIES Repeat Business-Free Details - Fleming, 6535 Cottage Grove, Chicago 60637.

INSTANT CASH COMMISSIONS Full or part time. Free sales kit features America's largest line low priced Business Printing, Advertising Specialties, Signs, Calendars and other necessities used daily by business people. Profitable repeat orders. No experience. No investment. No collections or deliveries. Write today. National Press, Dept. 724, North Chicago, Ill. 60064.

DISTRIBUTORS and Dealers Wanted. Over 1000 Items —Large Catalog-$2.00—Refunded With First Order. Milroy Distributing, 2811-15 E. Colfax, Denver, CO. 80206.

EARN $100.00 Daily selling Solargem Rings, jewelry. Free catalog. Anka-PM, 95 Washington, West Warwick, RI 02893

MAKE MORE MONEY IN 1977 FULL OR PART TIME. Show our Money Making Line of Calendars, Promotional Advertising and Gifts to local Businesses. No investment, collections or district managers. Prompt, friendly service with 68 year old firm, rated AAA-1. Weekly commissions and liberal bonus. Write John McNeer, Dept. PMC2, **NEWTON MFG. CO., NEWTON, IOWA** 50208.

NEED Wholesale Distributors. Full part time. Catalog-details $5 refundable. Auto Parts Wharehouse, 4225 N. Ozark, Chicago, Il. 60634.

AGENTS WANTED

SPARE TIME CASH. Sell famous Hanover Shoes. Samples, sales kit free. No experience needed. No age limit. Big commissions. Hanover Shoe, Dept. 1810, Hanover, Pa. 17331.

PROFITABLE Business! No Investment! Take orders for America's finest shoes from friends, neighbors! Profitable. Easy. No experience needed. Selling outfit free. Mason Shoes, K-266, Chippewa Falls, WI 54729.

PRINTING Advertising Salesmen—Excellent money-making sideline selling Decalcomania Name Plates, small quantities. Advertising Specialties, sign letters. Free Samples. Ralco XL, Boston, Mass. 02119.

SIDING—KITCHENS—ADDITIONS—Closers needed. 10% APR financing statewide. Ample leads. Warm climate. Move to Arkansas required. Par type commission. $40,000 annual easy—$60,000 for workers. Details: H-S Company, Box 5600, Little Rock, AR 72215.

WE FIND Manufacturers for you to represent—plus other valuable services. United Association Manufacturers' Representatives, 808 Broadway, Kansas City, MO. 64105.

BUSINESS OPPORTUNITIES

$400.00 Monthly Raising giant fishworms. Soilless method. Charlie Morgan, Bushnell, Florida 33513.

FREE BOOK!! "2100 Unique Ways To Make Money!!!" World's Biggest Collection!! Success-M, Box 40614, Detroit, Michigan 48240.

TAKE Catalog orders. We drop-ship 1001 best-selling specialty products. Lowest below-wholesale prices. Immediate delivery. Spectacular home business opportunity. Free Book. SMC, 6061 De Soto Ave., Dept. 20-50, Woodland Hills, CA 91365.

NEW Fire Extinguisher. Sample offer—huge profits. Norwich Chemical, Norwich, Connecticut 06383.

PIANO Tuning quickly learned with home study course. Diploma granted. American Tuning School, 17050 Telfer Dr., Morgan Hill, Calif. 95037.

MAILORDER Publisher wants dealers for outstanding instruction books and manuals. Wonderful dropship proposition free. Neil H. Tasker, Shamokin, Pennsylvania 17872.

PHOTOSTAMP Agents Wanted! Make Big Money From Home Mailorder. Free Samples, Information: Postermatic-C7, East Providence, R.I. 02914.

HOW Easiest mailorder business nets $40,000-yearly. Free proof. Send stamped envelope. Thompson, Box 761-M, National City, Ca. 92050.

EARN Money Raising Fishworms for us. Write Oakhaven-38, Cedar Hill, Texas.

CARPET—RUGS—WHOLESALE Make big money spare or full time selling carpet to friends—builders—motels—apartments. We drop ship to your customer. Commercial carpet—$2.39 yd., Rubber back shag—$3.65 yd., Heavy saxony plush—$4.25 yd. Many other styles available. Send $15.00 for professional samples of above styles to: Owen Carpet Co., 248PM, Resaca, Ga. 30735 or call 404-277-1321.

$500.00 Weekend taking **OLD TIME PORTRAITS!** Easy, Inexpensive. Detailed Manual, $5.00. VSU, Box 3586, Kenai, AK 99611.

$200.00 Daily. Guaranteed Results. Samples, Information, $6.00—refundable. Graphic-Arts, Route One, Box 95, Rapid City, South Dakota 57701.

$1.00 LISTS You year sent to 1000 Importers, Jobbers, Mailers, our mailing year. Dixiemi, King, North Carolina 27021.

MAILORDER Millionaire helps beginners make $500 weekly. Free report reveals secret plan! Executive 1A2, 333 North Michigan, Chicago 60601.

SELL SENSATIONAL LOW-COST BURGLAR ALARM. Lightening seller. Exceptional margin. Samples for trial. Northwest Electric, Ave. 655, Mitchell, S. D. 57301.

FREE 100-Page Catalog waiting to bring you Big spare-time cash commissions. Sell Advertising Book Matches. Every business a prospect . . . complete selling instructions furnished. Steady, repeat business. Dept. MX-277, Superior Match Company, 7530 South Greenwood Avenue, Chicago, Illinois 60619.

BECOME Our Mail Order Distributor with $150 Investment. Free Brochure. Audit Controls, 40 Brookside Ave., Fair Lawn, New Jersey 07410.

OWN Collection Agency!! $25,000.00 Yearly Possible. Master-PM, Dawsonville, Georgia 30534.

HOW TO RAISE $100.00 to $1,000,000.00!! Write: Capital-PM, Dawsonville, Georgia 30534.

CALIFORNIA MANUFACTURER NEEDS MAN To assemble our product and be local agent, experience unnecessary. May start while presently employed. Five-Figure income for responsible applicant. **S.K.R.M. Manufacturers, 1419 West Dolores Street, Wilmington, California 90744.**

PROFITS FROM CLASSIFIED ADVERTISING! Booklet shows you how to start your own business with Classified Advertising. Only $1.00 (Refundable with first order.) **H. E. KAPPEL, POPULAR MECHANICS, DEPT. P, 224 WEST 57TH STREET, NEW YORK, N. Y. 10019.**

FREE Mailorder Dropship Business Magazine! Mailer's World, Box 1355K, Sioux Falls, South Dakota 57101.

$200.00 Monthly Spare Time Making Novelty Items from scrap lumber. Workshop Five, 3800 Harney, Vancouver, Washington 98660.

100% PROFIT Bronzing Baby Shoes. **FREE LITERATURE.** NBC, Box 1904-PM, Sebring, Florida 33870.

VENDING Machines. No selling. Routes earn amazing profits. Big catalogue Free. Parkway Machine Corporation, 1930PMB Greenspring Drive, Timonium, Maryland 21093.

$200 WEEKLY! Make, Sell Bricks! Free information! Xcito Bricks, 5715 N. Mozart, Chicago, Ill. 60659.

BARGAIN! Mailorder library, professional secrets revealed. Free Details. Echo L2, Box 402, Magnolia, Tex. 77355.

MIDDLE MAN WANTED! Unusual position representing our company. No selling. Requires telephone, dependability, honesty in disbursing company money. Exceptional income. $2.00 for printing and postage brings application and descriptive catalog. Inland Empire, 1419 West Dolores Street, Wilmington, California 90744.

MAKE MONEY In Mailorder Sensibly. Moneyback Guarantee. Free Details. Associates, Box 212-PM, Stoneham, Massachusetts 02180.

GET Rich!! Secret Law Erases debts. Free newsletter exposes millionaires' Secrets. Blueprints (#B2,) 453 W256, NYC 10471.

BECOME "Mortgage Broker" Lucrative! Capital Sources, Box 640099-PM2, Uleta, Florida 33164.

$231.00 EXTRA Weekly Playing Mail Order "Money Game"!! Details—Business, 2205-J Robinhood, Albany, Georgia 31707.

CLASSIFIED ADVERTISING. 60,000 Buyers. $.15/word. Details **FREE.** Salco, 1432B Birch, Lewiston, Idaho 83501.

MAKE $1000 A WEEK CAMPING. No Capital, Land, Selling or Experience Needed. Free Details. Write: "Camping", Dept. 223, Box 1616, Torrance, Calif. 90505.

$32 Hour Possible, Spare Time! Earn $2,000 monthly —easy! 1000's of prospects in your area need Vinyl Repair, Refinishing, Recoloring for home/office furniture, Autos/Busses, Hotels/Motels, Restaurants, Cafes. Immediate Earnings. Free Opportunity Kit/Details. Special-T, 7360HN-Varna, No. Hollywood, Calif. 91605.

VINYL'S Where The Money Is! Invisibly repair, refinish, recolor furniture, luggage, car tops. Quick, easy. Two small $20 jobs a day earn you $1,000 a month. Homes, cars, offices, restaurants, unlimited customers. Start earning after a day's practice. Sensational details Free. VIP, 2007 Montrose, Chicago, 60618.

LEARN PORCELAIN REPAIR. Lucrative Business Guarded Technique Offered for first time. Write: W. Curtis, P.O. Box 121, Torrance, California 90507.

SELL Books by mail. Complete dealer set-up—Free. Midwest, Box 44R2PM, Shawano, Wis. 54166.

WORLD'S Largest Supply. 25% to 40% under wholesale. Closeouts. Hongkong clothes. Automobiles. Free details. International Buyers, Box 16386-MM, Portland, Or. 97233.

$1200.00 Monthly Raising Earthworms For Us. Free Details. Baker Enterprises, Box 193, Sparta, Ohio 43350.

YOUR Own Mailorder Catalog Business. No Merchandise investment. Details Free. A.M. Sales, 31-14 94 St., East Elmhurst, NY 11369.

EARN Big Money Working At Home! New report shows how—lists over 200 businesses to start on a shoestring. $4.50 postpaid. Guaranteed. Januz Communications, Box 109-AE, Lake Forest, Illinois 60045.

HOW To Collect Names, $6.00 Each. Dickinson-PME, 133 Falmouth, Rochester, New York 14615.

WATCH REPAIRING. For cash income or hobby. Free sample home study lesson. Chicago School of Watchmaking, YOA, Fox River Grove, Illinois 60021.

FREE Jewelry Sales Kit. Make 233% Profit. Courtesy Gems, 1634 Bogart, Bronx, N.Y. 10462.

I MADE $40,000.00 Year by Mailorder! Helped others make money! Free Proof! Torrey, Box 318YY, Ypsilanti, Michigan 48197.

MAIL Baby Catalogs to New Mothers for Big Profits! Details 25¢. Volz-PM, Ypsilanti, Michigan 48197.

HOW Mail Order Fortunes are made. Free information. Larry L. Ladner, Dept. 1, Box 7342, Metairie, La. 70010.

BE Financially Independent. Details. Wealth, 6220 York Road, Philadelphia, PA 19141.

$70 TO $200 WEEKLY—Home, Spare Time Simplified Mail Bookkeeping. Immediate Income. Easy. Auditax, Box 34741A, Los Angeles, Calif. 90034.

BIG MONEY IN CLOCK REPAIR. This Lucrative field **NEEDS** professionals. **BE ONE!** No obligation. School of Professional Clocksmiths, P.O. Box 176, (PMBB), Frankston, TX. 75763.

(Continued on next page)

BUSINESS OPPORTUNITIES
(Continued from preceding page)

IMPORT-Export opportunity, profitable world-wide, mail order business from home, without capital or travel abroad. We ship plan for no risk examination. Experience unnecessary. Free report. Mellinger, Dept. E2702, Woodland Hills, California 91367.

PREPARE Tax Returns—Policeman Albert Myers made $2,000 his very first season. Train at home. VA Approved. National Tax School, Monsey, 2BH, N.Y. 10952.

CUSTOM PICTURE FRAMING—A satisfying profitable craft! Learn at home—no experience needed, we supply everything. Booklet mailed free. Creative Framecrafters, 1205 W. Barkley, Box 16, Dept.-DCZ, Orange, California 92668.

AUTO BODY Repair. Easy Do-It-Yourself. Make Money —Save Money! Over 400 step-by-step instructional photos. Free brochure. Autocraft, Box I-JN, Moorpark, Calif. 93021.

REPAIR Hydraulic Jacks—Details Free. Write: Hydraulic Parts Supply, Box 4157, Brownsville, Texas 78520.

FREE BOOKLET FOR INVESTORS Describes many unique markets, investment mediums and services available at ABT, the nation's first exchange and marketplace serving average investors at the grassroots. Send today for free copy of "ABT Markets and Investment Mediums." Write: Arthur N. Economou, President, The American Board of Trade, Inc., 286 Fifth Avenue, Dept. A-17, New York City, 10001.

FM RADIO STATION Start your own. Complete information $5.00. Concept, Box 106, Lawrence, N.Y. 11559.

SELL Books By Mail. Write—Fletcher, 906M Lindale, Richardson, Texas 75080.

MAILORDER—Establish Own Business! Everything supplied—catalogs, photos, mailing lists. Merchandise dropshipped. Gif-Guide, 5818 Venice, Dept. 627, Los Angeles 90019.

$300-$700 Monthly. Raise Rabbits, Laboratory Animals for us, or Rabbits for Your Home Meat Supply to Meet the Critical Food Shortage. We Supply Equipment, Breeders, Instructions. Financing Arrangements. Details—25¢. Laboratory Animals, Inc. PM, Countyline Road, Pentwater, Michigan 49449.

FREE Report. New, unique, mailorder program. Grahamco, PMBX 99371, Tacoma, WA 98499.

AMAZING PROFITS Using Tested Methods. Free Details. Far, 75 Waringstown, Scarborough, Ont. M1R 4H5.

MAKE $100/DAY OR $20,000 THIS YEAR. SPARE TIME. 100% GUARANTEED. $5.00. Enterprise, Rt. 5, Box 272P1, Yakima, Wash. 98903.

REGISTER YOUR OWN TRADEMARKS. Simple Step-By-Step Instructions Book. Send $9.95 to: NTP, Box 1763, New York, New York 10017

STUMBLE UPON A FORTUNE In abandoned industrial silver. Yours for taking! Free information: Silverman K-13, Box 548, Woodville, Texas 75979.

MAIL Order millionaire mails Free report. Start your spare time home mail order business. Mailco, Dept. EC702, Woodland Hills, California 91367.

MAILORDER OPPORTUNITY! Start profitable home business without experience or capital. Write for **FREE BOOK,** case histories of successful members, plus complete details. No obligation. Mail Order Associates, Dept. 554, Montvale, NJ 07645.

MAKE $92.00 FROM Square Foot Plywood (Jigsaw or Bandsaw necessary). (Proof), details 25¢. (Refundable). Woodart, Bridgewater, Mass. 02324.

MAKE 1998% profit selling information by mail! Free proof! Stamp appreciated. SVEA, Box 73250, Metairie, Louisiana 70033.

$240 FROM ONE SHEET PLYWOOD! U-Build Poor Man's Catalog 35¢. Mile-Hi, Box 3173-PM3, Boulder, Colo. 80307.

NEW Home Business. $42.45 on $5.95 orders by mail! Stamp appreciated. Perriwinkle, Box 9417, Metairie, LA 70055.

999 Successful little-known businesses, work Home, Write: Acrey, 408 Austin, Edgewood, TX. 75117.

PIANO Tuning Learned quickly at home! Musical knowledge unnecessary. Free information. Empire School, Box 450327, Miami 33145.

INCREDIBLE New book reveals 1002 moneymaking plans! Free details!! Dewhurst, Dept. 1M2, 1827 North O, Lake Worth, Florida 33460.

MILLIONAIRE'S Easy Mailorder Method. $52,000 yearly! Rainbow (1A2), Box 16101, San Francisco 94116.

OWN Your Own Business. Select yours from dozens of offers in Business Opportunities Magazine. Get six Free Copies. Write: Specialty Salesman and Business Opportunities Magazine, 307-G N. Michigan, Chicago, 60601.

BE YOUR Own Boss! 1001 fast, easy ways to make money! Free! Rush name, address, zip. Money Making, 13263-F Ventura Blvd., Studio City, Calif. 91604.

MAIL-ORDER Tycoon helps beginners grow rich! Complete plan only $3.00. Guaranteed. Tycoon (2B2) 831 Wellman, Massillon, Ohio 44646.

HOW Much does being your own boss or making $25,000 per year interest you? The Warner breakthrough in the Engraving field could be your future. Write: Warner, Room EC-2-GC, 1512 Jarvis, Chicago, IL. 60626.

MAIL ORDER TAX SHELTER BUSINESS In the States and Canada explained. Can be profitable. Money back guarantee. Send $4.95 to: Erg Agency, Box 2661, Station D, Ottawa, Ontario, Canada.

MAILORDER BEGINNERS—SELL BOOKS—900% Markups! Write: **FORTUNITY** (4B2), 46 Cardwell, Orangeville, Ontario L9W 2V6

$193.00 Weekly. Guaranteed! Your home. One hour daily. Free details—Professional, Box 24543-A2, Saint Louis, Missouri 63141

300% Profit-Yours on Household Merchandise Brass Jewelry $3.00 (refundable) TKA Distributors, Box 5159EKS, Johnson City, Tenn. 37601.

"HOW Mail Order Fortunes Are Made", $8.95 . . . Free Particulars! Galen Murray, Box 547P, Hagerstown, Maryland 21740

EARN $7.68 hour With Your Jigsaw! Details, Sample Product—25¢. Carter, 80 James, Toms River, NJ 08753.

FREE Information-Make big profits in mailorder! **NALA,** Box 898 M2, Duluth, GA. 30136

YOUR Future, What lies ahead? Business Opportunities by: A&L Purnhagen, Dept. PM1, 65 Birs Ave., Lindenhurst, N.Y. 11757.

GET Rich by Mailorder Business. Guaranteed income. Details 25¢. Supran, Box 957, Flushing, N.Y. 11351.

MASTER TRADE SECRET Instantly multiplies sales. Triggers (Buy Mechanism). Free Information. Parallel Products, 315-A Henry Street, Belle Vernon, Pa. 15012.

EARN $60.00 Daily manufacturing Concrete Fence Posts. Practically no investment. Send stamped-addressed envelope. American, Excelsior Springs, Mo. 64024.

WOODWORKERS—Turn $4 material into $34.95. Free details! Pine Shop, PO Box 78P, West Peterborough, NH 03468.

BIG Money! Fantastic Business Huge Profits. Free Details. Revie, Box 40, Binbrook, Ontario, Canada LOR 1C0.

MAKE Money in Government Surplus. Learn how and where. Send $1.50. Robert Francis Co., 1129 N.E. Centurion Dr., Grehsam, Ore. 97030.

WOODWORKERS—Turn Scrap Material Into Saleable Products. Details 50¢ (Refundable). Woodshop "Genie", 6743 Hanbury, Long Beach, (PMB) California 90808.

START CHANNEL CATFISH Farm. Fast riches. Virgin field. U.S. instructions. Financing. Miracle brochure $1.00. Catfish Industries, Box 1089A, St. Petersburg, Florida 33731.

WHOLESALE AFFILIATES WANTED! Details. Trussman's, Box 13404-G, Greensboro, NC 27405.

MAKE MONEY On Government Surplus. How and where to buy. Directory of Surplus Offices. Sale Terms. Mail Order Items. Send $1.50. Marcus Fain, 810 Brighton Avenue, Dallas, Texas 75208.

VINYL MEANS MONEY! Cash in on the Big Vinyl Repair Boom! Men, women, all ages! $500 weekly possible! Repair car tops/seats, furniture in restaurants, hotels, homes, offices. Earn up to $30 an hour spare time! Experience unnecessary! Free Sample, Details—GTPN, 9710 Distribution, San Diego CA 92121.

$2,000 Weekly at home. Guaranteed. Let me show you how. No experience necessary. Send $1. Richlieu, Box 25357, Dept. J, Houston, Texas 77005.

GET Rich, Promoting Any Product, Giving Away Fabulous Vacations! Incentives, 1311-D Berkshire, Austin 78723.

DETECTIVE Agency. Free book tells how. Mayday, 620 West Howe, Seattle, Washington 98119.

FREE MAIL ORDER INSTRUCTION PUBLICATIONS CATALOGS. Cazin, 526 Maple, Redwood City, CA. 94063.

EARN EXTRA MONEY Selling Gifts, Jewelry, Specialty Items. No Membership Fee. Croft, 4809 West 97th Terrace, Overland Park, Kansas 66207.

CONTROL $1,000,000 IN REAL ESTATE! Net $2,000 monthly. No selling. No Capital to start. Unique leverage opportunity. Free Brochure. Kashbuilder, Box 1132-19R, Indianapolis, Indiana 46225.

"HOW To get into the **SOLAR ENERGY BUSINESS** with the greatest chance for success." Free Booklet. Write: InterCom Press, 10762 Tucker St., Beltsville, Md. 20705.

GUARANTEED $1,000 Monthly. Work One Hour Daily, Write: Unicorn, PM2, 7350 Nugget, Colorado Springs, Colo. 80911.

MAKE $2,000.00 MONTHLY. Spare time. Unique proven enterprise. No selling. No capital to start. Free brochure. Kashbuilder, Box 1132-19K, Indianapolis, Indiana 46225.

FREE MONEY MAKING Wholesale Profit Plan. Shows you how to start your own business. Consumer Enterprises, 175 N. Lumpkin, Athens, Georgia 30601.

NEWEST MONEY MAKING OFFER Produces **HIGHEST POSSIBLE PROFITS. FREE** details. Baran Organization, P.O. Box 271, Rego Park, New York 11374.

BUILD Greenhouses! Fun or Profit. Complete Plans $2.00. Revie, Box 40, Binbrook, Ont., Canada LOR 1C0.

LEARN The **TRUTH** About **MAILORDER.** Save **MONEY!** Save **TIME!** Details **FREE!** Mailorder Research, 726 South Jefferson, Abilene, Texas 79605

$300 Weekly Selling Information By Mail: Dilello, PM2, 101 Crotona, Harrison, N.Y. 10528.

SELL Books By Mail!! Huge Profits! Sample 2 Imprint Catalogs, Circulars, Full Details—50¢. K. Rogers Corporation, 84-59 129th Street, Kew Gardens, New York 11415.

HOW TO MAKE $50 ANYTIME you want it, guaranteed. How to start $20,000 Business (nothing to buy, ever) working five hours weekly. Plus, Free: Ca$h New$letter, all only $2: Ca$hco, 2232-M Arrowhead Ave., Brooksville, Fla. 33512.

FREE MAILORDER Report! Plan guarantees beginners $50.00 per order—to $750 weekly. Professionals, Box 21093E, Seattle, WA 98111.

JEWELRY MAKING—Big Money Business—Train at Home, Spare time. Tools, Materials, everything included with course. Free information. Jewelry Center, 4401 Birch, Dept. PBC17, Newport Beach, CA 92663.

IMPORT-EXPORT, MAIL ORDER, Men-Women-Families earn a fortune or extra income at home in this exciting fun way using spare time. Enclose $5.00 for color booklet outlining opportunities and particulars in full detail. Henry Melvin, 1540 Broadway, Suite 300, New York, N. Y. 10036.

BUMPER STICKER PRINTING DEVICE. Cheap, Simple, Portable. Free Details. Bumper, POB 22791 (GC), Tampa, FL. 33622.

FREE "1001" Odds"! $10,000-$100,000 actually made at home by oddballs! You'll never get over it! Publico, Carlsbad, Calif. 92008.

FREE SECRET BOOK "2042 Unique, proven enterprises", Fabulous "Little Knowns" Work home! Haylings, Carlsbad, Calif. 92008.

GET RICH! Use other people's money. Be Money Broker. Write: Milligan, 565-PMF Mohawk, Boulder, Colorado 80303.

PENNY MACHINE! Prints Lord's Prayer! Sample $1.00. World, Drawer-568B, Anaheim, California 92805.

MOTEL Managers needed! Simple booklet tells how I did it. $5.00. Hoffman, 6427 Lake Cable, Canton, OH 44718.

HOLLYWOOD Cementcraft: Profitable Home Business. Experience Unnecessary. Unlimited Pottery Designs Made Without Moulds. Birdbaths, Fountains, Wishing Wells, Waterfalls, etc. Chemical Coloring Formulas, Marble-Glazing. Free Brochure. Concrete Facts, Box 7B, Altadena, CA 91001.

YEAR'S Income in 8 weeks. Camping. No selling, capital or land necessary. Enclose Stamp. Write: Edru's, Box 46A, Gig Harbor, Wash. 98335.

CASH Beyond your wildest dreams with no investment or risk. Send $3, Dept. PM, Box 1865, Venice, Florida 33595.

CLIP NEWSPAPER ITEMS For $2.00 to $10.00 each. No investment. Free details. Cardinal Publishing, Box 5200-C38, Jacksonville, Florida 32207.

MONEYMAKING OPPORTUNITIES

SPARE TIME CASH. Sell famous Hanover Shoes. Samples, sales kit free. No experience needed. No age limit. Big Commissions. Hanover Shoe, Dept. 1808, Hanover, Pa. 17331.

PROFITABLE Opportunity! Manufacture and sell Detergents, Waxes, Polishes, Specialty Products. Many others. Complete formulas. Specialty Labs-PM2, East Providence, R.I. 02914

MAKE Money On Government Surplus. How and Where To Buy. Directory of Surplus Offices. Sales Terms. Mail Order Items. Send $1.50. Variety Enterprises, 4317 Park, Indianapolis, Indiana 46205

EXCITEMENT! Importing for pleasure or profit Brochure "How to Make Money in Import-Export" includes names and addresses of dealers around the world. Send $1.50 to: Trader Virj, Dept. PM, 16624 Bryant St., Sepulveda, Ca. 91343.

$31.75 DAILY AT HOME. No stuffing envelopes or mailorder hoax! Information: Stamped Envelope: Sbiamex, Postbox 4099, Valley Village, CA 91607.

MY New Business can easily make you over $2000. Per Month. Write: Armand Perez, 2505 Egleston Ave., Burton, Mich. 48509.

MAKE MONEY WITH YOUR IDEAS. Turn your ideas into cash. Booklet shows how anyone can do it. Send just $1.50 to: Lorenza Jewell, Dept. PM, 128-06 Rockaway Blvd., Jamaica, New York 11420

SELL Your Photos. Report tells how and where. Color slide markets. Only $1.50. David Burbank, Dept. PM-2, 910 Hampstead Ave., Richmond, Va. 23226

AMAZING Profits! Invest in valuable U.S. Mint postage stamps at face value. Details free! Hughes, Dept. 74, Eagle, ID 83616

HOW To make the fortune you deserve, and protect it from tax collectors, legally, forever. Write: Griffin, 79 Wall St., Suite 501PM, New York, NY 10005.

I MAKE EXTRA $$$ SELLING MY PHOTOS. So Can You! Detailed Information Only $1.35. Dave Lee, Dept. 146-8, 6125 Sutter Ave., Richmond, California, 94804.

AMAZING Profits! Pay face value for valuable unused U.S. postage stamps in mint condition and let your business pay for your investment. Details Free! J. Pachucy, Box 10313, Atlanta, GA 30319

(Continued on next page)

Материал с сайта www.retromagazine.com, авторы и правообладатели

MONEYMAKING OPPORTUNITIES
(Continued from preceding page)

COMPLETE PICTURE FRAME MAKING Manual Machine. Send $48.00 To Chan, Tricorn House, 6B Kingsley Ave., Southall, England.

HOW To Make Money writing short paragraphs. Information free. Barrett, Dept. C-27-A, 6216 N. Clark, Chicago, 60660.

CONTESTS—Sweepstakes, 52 pages of puzzles, pertinent information, pointers, 50¢. Prizewinner-P, 2901 28th St. No., St. Petersburg, Fla. 33713.

LEARN The secrets of repairing junk batteries. "Fabulous Profits" at home. Apex Engineering, 3100 Ramona, Atascadero, California 93422.

CLIP Newspaper Stories At Home! $2.00 to $10.00 Each. Write: Flair-PM4, East Providence, R.I. 02914.

GET RICH With secret law that smashes debts and brings you $500 to $2 million cash. Free Repo.t! Credit (6A2), 333 North Michigan, Chicago 60601.

VENDING Machines. No selling. Routes earn amazing profits. Big catalogue Free. Parkway Machine Corporation. 1930PMM Greenspring Drive, Timonium, Maryland 21093.

SELL SENSATIONAL LOW-COST BURGLAR ALARM. Exceptional margin. Samples for trial. Northwest Electric, Ave. 667, Mitchell, S. D. 57301.

MONEYMAKING Opportunity Booklets. Free Lists. Albins, 5625B Northampton Blvd., Omaha, NE 68104.

HOW TO WRITE MONEYMAKING Booklets, Folios. Any subject. Free details. Jaycee Barnes, Box 913-B, Glens Falls, New York 12801.

GAMBLERS—Free! Win lifetime income from dice, roulette, thoroughbred, harness, dog racing. Guaranteed! Research, Box 551 PM19, Mineola, NY 11501.

PROFITS FROM CLASSIFIED ADVERTISING! Booklet shows you how to start your own business with Classified Advertising. Only $1.00 (Refundable with first order.) **H. E. KAPPEL, POPULAR MECHANICS, DEPT. P, 224 WEST 57TH STREET, NEW YORK, N.Y. 10019.**

$200.00 PROFIT. Sheet ¼" plywood. Details 50¢. Novelties, 610 So. 24th, Elwood, Indiana 46036.

MAKE Statuettes, novelties, imitation marble. Sell to stores or start gift shop. Free details. Marbleizing, P.O. Box 1178, Ballwin, Missouri 63011.

FREE—Easy Ways to make money selling exciting new products—Full-spare time. Send name, age for 5 months free subscription. Salesman's Opportunity Magazine, 1460 Hancock Center, Dept. 802, Chicago 60611.

VINYL'S Where The Money Is! Invisibly repair, refinish, recolor furniture, luggage, car tops. Quick, easy. Two small $20 jobs a day earn you $1,000 a month. Homes, cars, offices, restaurants, unlimited customers. Start earning after a day's practice. Sensational details Free. VIP, 2062 Montrose, Chicago 60618.

UNLIMITED Earnings. Instant Mail Order Business. $2.00 (refundable). National, Box 22313, Cleveland, Ohio 44122.

GET World's Biggest Wholesale Import Catalog. Write: World, Medina, Washington 98039.

CASH For Pine Cones. New market. P-Shoppe, 3709 Atwell, Dallas, Texas 75209.

COLLECT COINS—INVESTMENT and **PROFIT.** How to Start, Buy, Sell and Find **COMPLETE SECURITY.** Booklet $1.50 . . . Hal Helms, 620 Scotch Range, Summerville, SC 29483.

BEAT THE CASINOS? 21 Dealer tells how. Library, Box 10420, Zephyr Cove, Nevada 89448.

BIG $$$ mailing letters. Free details. Shields, 18635 Groverdale, Covina, CA. 91722.

FABULOUS Import-Export Business. Start Small, Now. Book gives all information. $1.50. Thomas, 4003 Drummond, Houston, TX. 77025.

BIG MONEY! Make Thousands yearly selling financial information books. Free Details. Gillman, 916 13 Ave., Moline, Illinois 61265.

START Profitable Service Business. Details, Alena, Box 173, Farmingville, New York 11738.

MAIL Baby Catalogues to new parents. Fantastic earnings. Information .25¢. Moll-P.M., POB 36031, Grosse Pointe, Mich. 48236.

FREE Moneybook! Discover the money-making secrets of the rich. Up to $100,000 per year possible. Start home, spare time. Proven, **TESTED** plans. Hall, 44PM Greenfield St., Buffalo, NY 14214.

WIN Oil Lease. Free Details. Greenhill, Box 729PM, Taylor, Texas 76574.

FREE Details! "Millionaire Reports" information. **A** "must" for beginners! P. S. Specialties, 15-20 202 St., Bayside, N.Y. 11360.

OVER $16.50 an hour. Spare time at home! Rubber Stamp industry needs small manufacturers. We furnish all equipment and know-how! Particulars free! Write: Roberts, Room RC-2-GC, 1512 Jarvis, Chicago, IL 60626.

HOW To Make Money Re-Veneering Old Furniture. Information Free. Morgan, PO1M1, 915 East Kentucky, Louisville, Kentucky 40204.

CASH In on your ideas. Report tells how you can get paid for just thinking. Learn how now. $1.50. The Treasure Finders, 13890 S.W. Cherry Hill Ct., Beaverton, OR 97005.

DATING Introduction Service For Fun And Profit. Box 79424, Houston, Tex. 77079.

HOW TO WIN PRIZE CONTESTS. If you want to win, this is the manual you should have. Send $3.00. **BOWERS ENTERPRISES,** Box 4331-2B, Rockford, Ill. 61110.

INFLATION FIGHTER. Small Investment with **NO LOSS GUARANTEE.** Possible return of 20% to over 1000%. Invest less than $10.00 or hundreds. Details $2.00. Golden, Inc., 216 W. Jackson Blvd., Suite 612 G26, Chicago, Ill. 60606.

UNLIMITED Earnings Information. Send .50¢ and Stamped Addressed Envelope To: Dunavant Mailorder Inc., Box 348, Globe, Arizona 85501.

EARN EXTRA MONEY In spare time. Booklet shows you how. Send $1.50. Orange Street Specialties, Dept. 101, 3274 Orange St., San Jose, Ca. 95127.

BUILD INCREDIBLE LIFETIME Income writing short reports at home! Details airmailed. Sweatt, Box 12, Mims, Florida 32754.

EARN Extra money in spare time selling books by mail. Uldis, Box 34672, Los Angeles, Californ'a 90034.

$200 WEEKLY! Mail Order Opportunity. Ultimate, Box 893A, Casselberry, FL 32707.

EARN Money at Home Hundreds of ideas. Free information. A Rejocal, Box 2346, Taber, Alta. TOK 2G0.

ASSEMBLE Product Spare Time. G & H Industries, Box 6603, Providence, R.I. 02940.

101 Practical Ways To Make Big Money At Home!! Often Within Weeks! Details. McNiece, Box 132-M2, Old Bethpage, New York 11804.

SELL YOUR PHOTOS. Report tells how and where. Color slide markets only $1.50. Rainbow Gifts, Dept. PM1, 19153 CR-104, Bristol, Ind. 46507.

MAKE Money writing information. Free details. National Post, Box 2951MB, Culver City, California 90230.

MAKE EXTRA MONEY. New booklet shows you how to make money in your spare time—without working. $1.50. Holiday House, Dept. PM2A, 810 Cottonwood Dr., Lincoln, Nebr. 68510.

FANTASTIC MAILING Program brings huge profits fast. Dealers wanted. Eon, 606-A Willow, Waukegan, IL. 60085.

FREE "1001 ODDS"! $10,000-$100,000 actually made at home by oddballs! You'll never get over it! **PUBLICO,** Carlsbad, Calif. 92008.

FREE SECRET BOOK "2042 Unique proven enterprises". Fabulous "Little Knowns" Work home! Haylings, Carlsbad, Calif. 92008.

EARN $10 DAILY AT HOME Writing short articles. Begin Immediately! Copyrighted report reveals how and where. Send $1.50 plus 50¢ postage to: Rolco, Dept. P, Box 1113, Corsicana, Texas 75110.

"CB"—Sell new engraved metal "CB" plates for big profits. Make $1.50 per sale. **FREE SALES KIT.** Engravaplates, Box 10460-CB32, Jacksonville, Florida 32207.

RABBITS, CHINCHILLAS, FUR BEARING ANIMALS

AMAZING Profits! $10,000 Yearly Raising Rabbits for Wool and Breeding. Details—$1.00. American Angora, Malta 12, Montana 59538.

RAISE RABBITS SUCCESSFULLY—Put H'gh Protein Meat on your Table. 68 Page Illustrated Booklet Tells How. 50¢ includes handling and mailing. American Rabbit Assn., 36 ARBA Bldg., Bloomington, IL 61701.

BREEDING Stock, New Zealand White Rabbits. Pedigreed. Commercial, Meat-type. Hilltop Acres, Rt. 2, Argyle, Wis. 53504.

$500-$1000 Month plan raising rabbits for us. Free details. White's Rabbitry, PM, Hudson, Ohio 44236.

PETS—BIRDS, CATS, HAMSTERS, ETC.

999 Color Picture Catalog $1.00. Swans, Peacocks, hobby supplies—"Everything—You Name It!" Stromberg Pets Unlimited, Pine River 59, Minnesota 56474.

PET HERMIT CRAB. I will live almost anywhere and eat almost any thing. I don't smell. P.S. I like peanut butter. $3.00. Hermit Crab, P.O. Box 440-644, Miami, Florida 33144

HORSES, LIVESTOCK

TECHNIQUES, DO'S IN REGISTERED CATTLE MANAGEMENT, Illustrated in booklet $2.00. H.C. Wilson, Box 27, Christinna, Tennessee 37037. Confidential Consultant on request.

FREE Book about horses—break, train for pleasure and money. Profusely illustrated. (Since 1909) Beery School 1102, Pleasant Hill, Ohio 45359.

EARTHWORMS, LIVE BAIT

EARN Money Raising Fishworms For Us: Exciting details free! Oakhaven-56, Cedar Hill, Texas.

GEORGIA Grey Nightcrawlers—Raise or Retail—Profitable—Free Literature—Fain's Wholesale Bait—Edison, Georgia 31746.

FREE Literature. Profitable Business Raising Fishworms, Crickets. We Teach you how to Raise and Sell. Write today. Carter Fishworms, Plains, Georgia 31780.

RAISE Grey Hula' Redworm Soilless Method. Three Oaks, Dresden, Tenn. 38225.

HYBRID Red Worms: 5000-$15.00, 20,000-$30.00, Postpaid. Raising instructions. Brazos Worm Farms, Box 4185, Waco, Texas 76705.

AMAZINGLY Profitable Earthworms! Earn $6,000 yearly, sparetime. Raise in backyard, garage, basement. Easy. Exciting free details. Mt. Peak Hatcheries, Box 735M2, Midlothian, Tx. 76065.

FROGS, FISH, REPTILES

$20,000/Year Possible Raising Bullfrogs! Backyard Operations Revealed! Exciting details 25¢. Quaestor, Box 2787EEB, Rochester, N.Y. 14626.

BULLFROGS Turn Bullfrogs into greenbacks. Frog farming is interesting and profitable. How and where to start $2. Slabaugh Bullfrogs, Rt. 3, Poplar Bluff, Mo. 63901.

POULTRY & GAME BIRDS

DUCK Picker $15.00—fits electric drill. Canadian Honkers, Pheasants, Quail. 999 picture color catalog $1.00. Stromberg's, Pine River 59, Minnesota 56474.

OF INTEREST TO ALL

UNUSUAL Personalized items. Cards, labels, stamps. Free catalog. Sunshine, 604 Cross Creek, St. Louis, Mo. 63141

SAVE Up to $5,000 or more yearly. Over 50 valuable home energy saving methods. $3.00. Watkins A-1, Box 1582, Ormond Beach, Florida 32074

PROGRAM Your mind for more money, love, happiness. Details. Jan Associates, Dept. B, 400 30th Street, Oakland, Ca. 94609.

GET AN OFFICIAL PRESS CARD. Send $12. Associated News Service, Box 22007M, San Francisco, Ca. 94122.

SELLING YOUR HOME? Attract buyers fast and realize top profit! . . . Free details . . . Reselling, Box 113-PM1, Kendall Park, NJ 08824.

SAVE Money when Buying Your Home. Brokers Report. Free details. A. Radous, Box 506, Chesterland, Ohio 44026.

METRIC POCKET GUIDE Converts United States measures into metric. $1.00. Ellenbogen, 450T Seventh Avenue, New York 10001.

HARD TO WAKE UP? Try Ultra Alarm. For simple plans send $2.00 plus stamped, self-addressed envelope to: **ALARM,** Box 201, N. Tonawanda, N.Y. 14120.

IMPROVE Greatly Your Pictures!! Invaluable Photographic Advice! $1.75. Metros, P.O. Box 3238, North Hollywood, Cal. 91606.

MILLIONS WON In Federal Oil & Gas Lottery. Details, Send $1.00. Amerilease (1), P.O. Box 25546, Milwaukee, Wisconsin 53225.

OF INTEREST TO WOMEN

WANT A new car, color TV, new clothes? Learn hundreds of ways to make money. 5 month subscription Free. Write: Salesman's Opportunity Magazine, Dept. 800, 1460 Hancock Center, Chicago 60611.

QUILTING FRAMES—Two plans available, very easy to make. One is adjustable the other folds flat for storage. Photocopy of plans as they appeared in PM. Price for both $1.00. Send order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

GOLD MINE In Garage Sales—$3.00. **PAN,** Box 347A, Jamestown, RI 02835

SOCIAL SECURITY PLATES

GOLD Metal Social Security Plate $1.75 with Black Case And Identification Card. Send Name and Number to: George Anthony, PM2A, 626 Clinton Street, Brooklyn, New York 11231. Money Order Only.

GOVERNMENT SURPLUS

JEEPS—$52.50!—**CARS**—$33.50!—**200,000 ITEMS!—GOVERNMENT SURPLUS—MOST COMPREHENSIVE DIRECTORY AVAILABLE** tells how, where to buy—**YOUR AREA**—$2.00—**MONEYBACK GUARANTEE**—Government Information Services, Department B-2, Box 99249, San Francisco, California 94109 (165 Cervantes).

HOW TO BUY GOVERNMENT SURPLUS. Report tells how and where to buy in your area. Many items sell at a fraction of the cost. Complete Directory of Government Surplus Sales Depots. Mail $2.00 to Passport Products, Box 217-A, Mansfield, Texas 76063

GOVERNMENT LANDS FROM $7.50 ACRE! Homesites, farming, vacationing, investment opportunities! "Government Land Buyer's Guide" plus current listings—$2.00. Surplus Lands, Box 19107-AB, Washington, DC 20036.

"U.S. GOVERNMENT SURPLUS Directory." How, Where to buy 100,000 items (including Jeeps) . . . low as 2¢ on dollar! Most complete information available . . . $2.00. **SURPLUS DISPOSAL,** Box 19107-AB, **WASHINGTON, D.C. 20036.**

1977 Surplus Army, Navy Store, 64 Page illustrated catalog. Send $1.00. Ruvel, 3037 North Clark, Dept. 10-J, Chicago, Illinois 60614.

GOVERNMENT Surplus, How and Where to Buy in your Area, send $2.00. **SURPLUS,** 30177-PM **HEADQUARTERS BUILDING,** Washington, D.C. 20014.

(Continued on next page)

GOVERNMENT SURPLUS
(Continued from preceding page)

JEEPS, TRUCKS, Typically from $52.40 . . . Automobiles, Boats, Motorcycles, Airplanes, Typewriters, Tools, Clothing, Sports, Camping, Photographic, Electronics Equipment . . . 200,000 Bid Bargains Nationwide Direct From Government . . . Low as 2¢ on Dollar! Surplus Catalog and Sales Directory $1.00 (refundable first order). National Surplus Center, 240 Eastcass-PPM, Joliet, Illinois 60432.

HOW WHERE To buy Government Surplus. Send $2.00. **SURPLUS INFORMATION,** Department 712, 2608 Simmons Drive, Grove City, Ohio 43123.

MAKE MONEY On Government Surplus. How and where to buy. Directory of Surplus Offices. Sale terms. Mail Order items. Send $1.50 plus 50¢ postage to: Rolco, Dept. P, Box 1113, Corsicana, Texas 75110.

LOANS BY MAIL

FREE Details on how to borrow $300-$3000 entirely by mail. Write Postal Finance, Dept. 17-01, 6018 Maple, Omaha, Nebraska 68104

BORROW—NO LIMIT!!! NO PAYBACK BEFORE 1987!!! NO COLLATERAL!!! Loan Package—$1.00 or Equivalent Postage: Loans, Box 3547, Dalton, Ga. 30721

UNLIMITED Loans—agricultural, business, construction, New-venture-All types-Percy Robicheaux, Franklin, La. 70538.

LOANS, Business, individual, any purpose $2,000 to $10,000,000. Inquire: J.C. Cooper, 1605 Stetson, Modesto, Calif. 95350.

PERSONAL

DRINK . . . Drive Legally With "Alco-Calculator." $3.00. Hazelwood, Box 534A, Metuchen, NJ 08840

STOP YOUR CREDITORS COLD! No Borrowing Or Bankruptcy Clears Credit Stops Bill Collectors instantly Before You Pay Another Bill. Send $5.00 For Complete Booklet To: Credit A-II, Box 863, Perryton, Texas 79070 **GUARANTEED**

RECORD Telephone Conversation automatically. Leave Recorder Unattended. Robert's, Box 49-PM2, Parkridge, Illinois 60068.

ESCAPE From debts and bill collectors! Have AAA-1 credit everywhere. Free report reveals secret plan! Credit 4A2, 333 North Michigan, Chicago 60601.

INVESTIGATORS, Latest electronic aids. Write: Clifton, Box 220-P, Miami, Florida 33168.

WARTS. Vergo® Cream is painless, safe, easy. Buy Vergo® at better pharmacies.

BIBLE Questions answered. Stamped envelope. Bylon, 17167 Bentler, Detroit, Michigan 48219.

DON'T Die without a Will. Will Form and Instructions, protect your family. Only $2.00—guaranteed. Order Today!! Allform, 919 Russet Street, Dept. 1A2, Racine, Wis 53405.

FINANCE YOUR DREAMS With Government and Foundation Grants. Free Details. Tou-PM2, 432 PCH, Hermosa Beach, California 90254.

PSORIASIS SUFFERERS: DISCOURAGED: Write for Free important information that is helping thousands. Pixacol, Box 29277PM, Parma, Ohio 44129.

SMOKING, But can't quit? We understand and can help. Proven plan guides you to success. Booklet $3.00. T. Jolly, Box 2612, Flagstaff, Arizona 86001.

LOOK MEN! Learn "What You Should Know About Women"—And "Stop Smoking Forever"—Only $1.00. Hall's USSAH—Box 23XX, Washington, D.C. 20317.

BANKRUPT Individuals—Reestablish your credit rating within 90 days. Send SASE to: H-L Hamilton—P.O. Box 42384—Atlanta, Ga. 30311.

COMPLETE WILL KIT! $1.98. Willow Winds, PM2, 606 Willow Court, Waukegan, Illinois 60085.

MARITAL CONFLICT? Make your fights creative. $5.00. Rev. John Albrecht, St. Mary's Episcopal Church, 2512 Joslyn Court, Lake Orion, Michigan, 48035. Also, Proper Christian Burial. Letter to Survivors. $5.00.

REMAILING SERVICE

UNLISTED ADDRESS. Discreet and confidential. Remail 50¢ single. Mail Forwarding Service, 8050 S. Main, Houston, Texas 77025.

LAS VEGAS-CONFIDENTIAL. Business and Personal Remailing. More! Details: Alpha, Box 19547, Las Vegas, Nevada 89119.

ANONYMOUS, Confidential, Private Remails: 50¢. Potemco, Box 339, Interlaken, NY 14847.

MANHATTAN: Mailing address. Confidential! Reasonable monthly rates. Mail handled as requested. Send Sase. Call Director, 1540 Broadway, N.Y.C. 10036.

IRFA Members Monthly Rates. Flink, Box 1536M, Hilo, Hawaii 96720. Franckowiak, 2005M Waterview Court, Suite D, South Bend, Indiana 46637.

1977-78 REMAILING DIRECTORY $3.00. International Remail Forwarding Association, P.O. Box 1744M, Miami, Florida 33134.

RECEIVING, Forwarding, Hub, Regd. P.O. Box 64, Moncton, N.B. Canada E1C 1H2.

REMAIL D.C., Va., MD. area, 50¢ any size. Wong-D1, 16 Steven Ct., Gaithersburg, MD. 20760.

FREE Details. Receiving—Forwarding. Dependable Mail, 509-P Yosemite, Fresno, CA 93728.

FLORIDA Mail Service. Receiving—Forwarding. Allen, 6326 Autlan Drive, Jacksonville, FLA. 32210.

CALIFORNIA Remails, Confidential, .30¢. Discount details with S.A.S.E.; Plum, Box 81, Capitola, California 95010

RIO DE JANEIRO Air Remails, Forwarding, $1.00. Free postcards, envelopes. Confidential services. BRAZILFAX, Caixa Postal 15071, ZC-06, Rio de Janeiro, Brazil.

MISCELLANEOUS

PAINT BRUSHES??? Save Money!!! Factory to you! Highest Quality Sizes: One, two, three, and four inch. Set of four (one each size)—$3.00. Set of eight (two each size)—$5.00. We pay postage! Full Satisfaction or Immediate Cash Refund!!! Pioneer, Box 25A, Stanwood, MI 49346.

BOOKS On antiques and their prices. Free circular!! P. Warman Publishers, Uniontown, Penna. 15401.

ORNAMENTAL Iron designs. Book of 1600 beautiful, practical designs for railings, columns, etc. Free literature. Cunningham, 3881 South 3200 West, Box 20005, Salt Lake City, Utah 84120.

HEARING Aid batteries wholesale. Free list. Habs, Box 51, York, Penna. 17405.

IDENTIFICATION CARDS. Send stamped self-addressed envelope for samples. **NIPCOM,** 727 North Main, Las Vegas, Nevada 89101.

PHOTO IDENTIFICATION CARDS . . Certificates . . **GUARANTEED!!** Samples 25¢ . . Bascco, Box 3461 M27, Providence, R. I. 02909.

WIN PHONE-IN RADIO CONTESTS!! Learn **"SECRETS"** Of Telephone System!! $3. **WINNER,** P.O. Box 1852P, Cheyenne, Wyo. 82001.

IDENTIFICATION CARDS. Send for information. 929 University Ave., Berkeley, CA. 94710.

DON'T Die Without A Will! Kit includes four forms, instructions and extras. Order today! Only $2.50! Ca. Residents add tax. Rite Now Company, 311 California, Suite 700-PM2, San Francisco, Ca. 94104.

DON'T SEND ORDINARY CARDS! My Birthday and Get-Well Cards are Original and Humorous. Send $2.00 for 5. Juthor Enterprise, Box 1547, Carol City, Florida 33055.

WANTED MISCELLANEOUS

MERCURY Gold, Silver, Platinum: Ores assayed. Wholesale Terminal, Norwood, Mass. 02062.

WANTED!!! Lionel Electric Trains & Accessories. Garton's, 5th & Vine, Millville, N.J. 08332.

HEARING AIDS

HUGE SAVINGS. Eliminate dealer mark-ups. Free Trial. Batteries Wholesale. Terms arranged. Lloyds-PMC, Rockford, Ill. 61104.

FREE HEARING AID CATALOG—Save ½—by mail! write: **"MONEY$AVERS",** 9530PM2 Langdon, Sepulveda, CAL 91343.

HEARING Aids, Batteries, Discount Prices. Free Trial. Write: Rhodes, Brookport, Illinois 62910.

REPAIR Hearing Aids. "Prompt, Reliable Service". Monmouth, Box 1009, Asbury Park, N.J. 07712.

TOBACCO

SAMPLES Sweet Chewing or Smoking. 25¢ each. Jolley Farms, Dresden, Tenn. 38225.

MEERSCHAUM Pipes: Discount Catalog. Nantucket Imports, Box 293-P, Carlstadt, N.J. 07072.

FREE Color catalog unusual smoking pipes. Not available in stores. Send 13¢ stamp to: Toro Boy, Box 998E, Apopka, Florida 32703.

SCIENCE & CHEMISTRY

DISCOUNTED! Laboratory Chemicals, Glass Apparatus. Catalog 50¢. Deluxe Scientific, 507 Huron, Manitowoc, Wisconsin 54220.

FANTASTIC Chemical Catalog. Surprising Extras. $1.00. Kenrus, Box 205, Staten Island, New York 10306.

FORMULAS, PLANS, ETC.

OUTSTANDING Tone On Wooden Instruments. Instruction $5.00. Marc Anthony, P.O. Box 1205, Crescent City, CA 95531.

ANY Formula $6.00. Catalog—Manufacturing Treatise $1.00. Belfort, Box 568, Chicago 60690.

SPECIAL SERVICES

GHOSTWRITING. Professional. Confidential. Writers Unlimited, Box #4391, Washington, D.C. 20012 (202) 723-1715

INFORMATION On anything. Ferguson Research Specialists, 60-15 Woodside, Woodside, New York 11377.

PROFITS FROM CLASSIFIED ADVERTISING! Booklet shows you how to start your own business with Classified Advertising. Only $1.00 (Refundable with first order.) **H. E. KAPPEL, POPULAR MECHANICS, DEPT. P, 224 WEST 57TH STREET, NEW YORK, N.Y. 10019.**

DOW JONES INDUSTRIALS, 30 Daily 8½x12 Stockcharts, Introductory Special, $8.95. Ruf, 22 Garfield Place, Poughkeepsie, NY 12601.

BETTER HEALTH

DIET PLAN THAT Works. Secrets To Sticking To Your Diet Made Easy. Report **INCLUDES BETWEEN MEAL SNACKS.** Send $1.50 To: Jas. L. Smith, RR #2, Dept. 2, Boonville, IN. 47601.

FOR THE HOME

FUELMISER Reclaims Heat from Furnace Stack. Easy Installation. Thermostatically controlled. $139 up. Hiestand Distributors, Marietta, Pa. 17547.

INSULATE All windows completely with clear inflatable **WINDBAGS.** Box 222, Millersville, MD. 21108.

SAVE MONEY—Save Energy! Do-it-yourself guide saves you 65% on heating and electrical bills . . . Guaranteed. Send $2.00. Dacy Publisher, Box 509-M, Shrewsbury, Massachusetts 01545.

WIND-ELECTRIC Systems. Advanced. Reliable. Extremely Economical. Ultima Corporation, Coppitt Rd., Key West, FL 33040.

WEARING APPAREL

DISTINCTIVE—2¼" x 3¼" Mahogany Belt Buckle, $6.25. Buckle, Box 34, Sicklerville, N.J. 08081.

REPAIRS & SERVICING

SERVICE YOUR OWN CAR! BUY POPULAR MECHANICS CAR REPAIR ANNUALS. These editions are still available: 1971, 1973, 1974 and 1975. Price, $1.00 each. Send Order to: Popular Mechanics, Dept. HE, Box 1014, Radio City Sta., New York, N.Y. 10019.

GARDENING & LAWN CARE

PM'S BESTSELLING "COMPLETE GARDEN GUIDE" For the man who needs all the basics . . . fast! Superbly organized in famous "Master Guide" format. Dozens of tables, charts and illustrations. Literally crammed with timely bonus specialties like vegetables, fruits, nuts and herbs, garden pools, storage structures, planting dates. Only $4.95 + 50¢ to cover postage and handling. PM Complete Garden Guide, Dept. HE, Box 1014, Radio City Sta., New York, NY 10019.

FLOWERS, PLANTS, & NURSERY SUPPLIES

NEW Booklets: House Plants, Containers, Landscaping. **FREE** Details! Laurel Enterprises, 525-7B Kensington, Lancaster, Pa. 17603

LEARN Landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. A-174, 2251 Barry Avenue, Los Angeles, California 90064.

GINSENG Bringing $40 Pound. Have Seeds, Roots. Information, Growers Manual $1.50. K. Collins, Viola, Iowa 52350.

WINEMAKING & OTHER RECIPES

WINEMAKERS. Free Catalog. Equipment. Supplies. Continental, Box 68016PM, Indianapolis, Ind. 46268

FANTASTIC JERKY. SAVE 50%. make western tasting **BEEF, ELK, DEER JERKY** in own oven. Great eating at home, around a campfire. Easy fast preparation. **EXCELLENT** recipe for $3.75 or free info: Jerky, Box 3935, Ventura, CA. 93003.

CORN Whisky—How you can make the finest—smoothest corn or rye whisky for less than $2.00 quart right in your kitchen—very simple. Complete plans and recipes—Satisfaction guaranteed. Send $3.00 today to —Resaca Publishing Co., 248PM, Resaca, Ga. 30720.

WINEMAKERS. Free illustrated catalog of yeasts, equipment. Semplex, Box 12276R, Minneapolis, Minn. 55412.

BEERMAKER'S Supply Catalog—Free. Bacchanalia, 273 Riverside Ave., Westport, Conn. 06880.

WINEMAKERS BEERMAKERS EXTRAORDINARY INFORMATIVE CATALOG FREE, 350 Equipment, ingredients items. **DANENBERGER'S,** Box 276M, New Berlin, Illinois 62670.

BURGLAR ALARMS & HOME PROTECTION

DIALING Unit calls police. $29.95. Free catalog. S&S Systems, 5619-D St. John, Kansas City, MO. 64123 (816)483-4612.

BURGLAR ALARMS, Supplies. Catalog: $1.00. Refundable. EPS, 1419 Morgan Wood, Lakeland, Florida 33801.

PROFESSIONAL Burglar-Fire Alarm Equipment at Discount Prices. Catalog 50¢. Emel Electronics, Box 146J, Sheffield, Mass. 01257.

PROTECT YOURSELF 8,000 Volts Shock Stick, Small and Light, take it anywhere, very painful but no permanent harm to man, animal, 200 Shocks, $59.95. Complete Freight Paid Check, Cash, Master Charge, Americard. Guardian, 2402 Olive, Burbank, Calif. 91506.

FREE 48 Page Burglar and Fire Alarm catalog. Supplies and information. Protecto Alarm Sales, P.O. Box 773B, Michigan City, Ind. 46360.

BURGLAR PROOF Your home for $50. Complete plans. Send $1 for information. Rosedale Enterprises, 110-2 W. McMillan, Cincinnati, OH. 45219

LOOKING FOR IDEAS ON HUNTING, FISHING, CAMPING, BUILDING, TOOLS, ETC.? CHECK THESE LISTINGS. THEN USE THE COUPON BELOW.

WORTH WRITING FOR

609. The weather will soon be warmer—
and it's time to get ready for planting. Mussers Forests offers their 36-page illustrated catalogue of seedlings, transplants, shrubs, ornaments and more to beautify your home and garden. Free.

610. Canoe, Canoe?
Grumman Boats offers three free booklets on canoeing . . . The All Season Sport for all ages. See their complete line of canoes in this attractive full-color brochure—including 20-ft. canoes and convertible sail canoes. Also included are the names of places in your area where you can learn to canoe and rent canoes. All three are free.

611. Asthma, Allergy or Bronchitis sufferer . . .
or even if you just want to breathe clean air, then an air purifier may be the thing for you. Vitaire, makers of ozone free air cleaners, offers this free booklet describing the benefits of home air pollution control. Learn how you can remove smoke, dust, pollen and other irritants and live in a virtually pollution free environment for just pennies a day. Free from Vitaire.

612. Vans, RV's and Mini Trucks . . .
Easily made into super vans. T & H Van Works offers this 32-page booklet complete with photos showing their complete line of van accessories, parts, equipment and any other gear you could possibly need for your van. $1.00

613. Popular Mechanics All New Special Projects Catalogue
Get to see the best of PM's famous projects and plans. They're all here plus more in this brand new, 1977 edition of PM's fabulous Special Projects Catalogue. Included also are titles of past great PM articles that you can order. Thumb through the pages for loads of fascinating ideas to save you time and money, and best of all, to enjoy! Just $.50

614. Build your own boat . . .
And Glen-L Marine Designs will provide you with the plans to do it. This 130-page catalogue is packed with hints and tips about boat building—and, you can see the complete line of plans and patterns from Glen-L. Just $1.00.

615. A sharp tool is safer—
and in this brochure from Carborundum, you'll see the proper way to sharpen cutlery and common tools. And, you'll find a listing of Carborundum's products to do any sharpening job. Free.

616. Grow beautiful flowers without being an expert
This colorful 16 page booklet provides basic information plus many ideas, on how to create beauty around your home with flowers. Includes advice on plant selection, how to plant and seed, how to fertilize and look after flowers and more. Free from O.M. Scott and Sons.

617. Suit yourself . . .
with an overhead garage door that's right for your home. See Ridge Doors complete line of garage doors suited to every style of achitecture in this full-color beautifully illustrated brochure. Free.

618. Mopeds are sweeping the nation . . .
and here's a chance to see the latest Mopeds from Motobecane/Solex. Get your free 14-page color booklet on the Ultimate Moped, complete with information and illustrations of every Motobecane model available in the U.S.

619. Little spray gun . . .
for hobbyists. Mix and store any kind of paint in Hobby-Guns' 1-oz. jars. Spray model trains, planes, pottery, furniture and more. Ideal for touching up autos, bikes, boats. Operates with any size compressor or air tank. See it in this free pamphlet from W. R. Brown Corp.

620. Save energy!
Power attic ventilators are still a good means of conserving energy in the home. And, Leslie-Locke Home Environmental Products show you why proper attic ventilation is important and how to do it economically in their literature. Learn how power attic ventilators save . . . and more . . . Free.

621. Water, water everywhere—
and Gould's Pumps, Inc. offers this free booklet with useful information for any homeowner. See how to calculate your water needs and more, plus Gould's complete line of pumps in this free 16-page booklet.

622. Power Tillers Let You Till with one hand.
Here's a quality unit for the gardener with ¼ acre or more to care for. Power drive wheels on this 8 hp rear tine tiller do all the work and the chain drive gives you the power you pay for. Free brochure from Amerind-MacKissic, Inc.

623. Popular Mechanics: Complete Car Repair Manual
Slash auto repair bills by handling most maintenance and repair jobs yourself. This big, 328-page book gives step-by step, "how-to" instructions supplemented with detailed drawings and photos. Only $9.95.

624. Accutrac 4000 - The Future is Now.
ADC's Accutrac 4000 *is* the only automatic direct-drive turntable with electronic track selection and computerized memory bank—and, you can see it all in this big 12-page booklet. See this fascinating state-of-the-art turntable in this free booklet from ADC.

Popular Mechanics 277
Box 1718, Sandusky, Ohio 44870

This Coupon Expires April 30, 1977

Please see that I receive the items checked below. I have enclosed 35¢ for the overall service charge, plus remittance for any priced items.

☐ 609	☐ 612 $1.00	☐ 615	☐ 618	☐ 621
☐ 610	☐ 613 50¢	☐ 616	☐ 619	☐ 622
☐ 611	☐ 614 $1.00	☐ 617	☐ 620	☐ 623 $9.95
				☐ 624

Total items requested _____ Total money enclosed (including 35¢ service charge) _____

Name (Please Print) _____

Address _____

Town _____ State _____ Zip Code _____

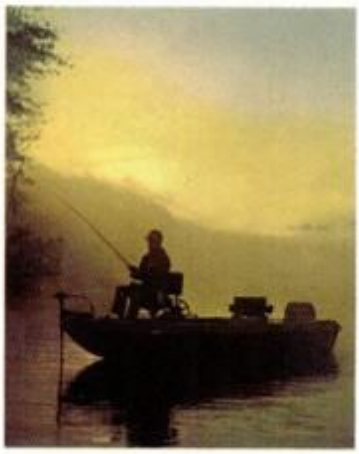
(Please send cash, check or money order made out to POPULAR MECHANICS. No stamps, please.)

Note: Popular Mechanics processes your requests for the above information and forwards these inquiries to the organization making the offer. Each company mails the material directly. Please allow 4-6 weeks for delivery.

Материал, защищенный авторским правом

© 1976 R. J. Reynolds Tobacco Co.
Most low 'tar' cigarettes have no taste.
Winston Lights
A lot of new cigarettes give you low 'tar' and nicotine numbers. But I can't taste numbers.
What I can taste is Winston Lights. I get lower 'tar' and nicotine.
But I still get real taste. And real pleasure.
For me, Winston Lights are for real.
Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.
13 mg. "tar", 0.9 mg. nicotine av. per cigarette, FTC Report APR. '76

Male chauvinist rig.
...LIBERATED



Let's face it, men: Bass busting isn't what it used to be.

We've made it too soft, too easy, too productive — too much fun.

No way we could keep a thing this good all to ourselves.

So now we have lady bass busters. And teen-age skiing behind bass boats. And family picnics that feed on fresh-caught bass.

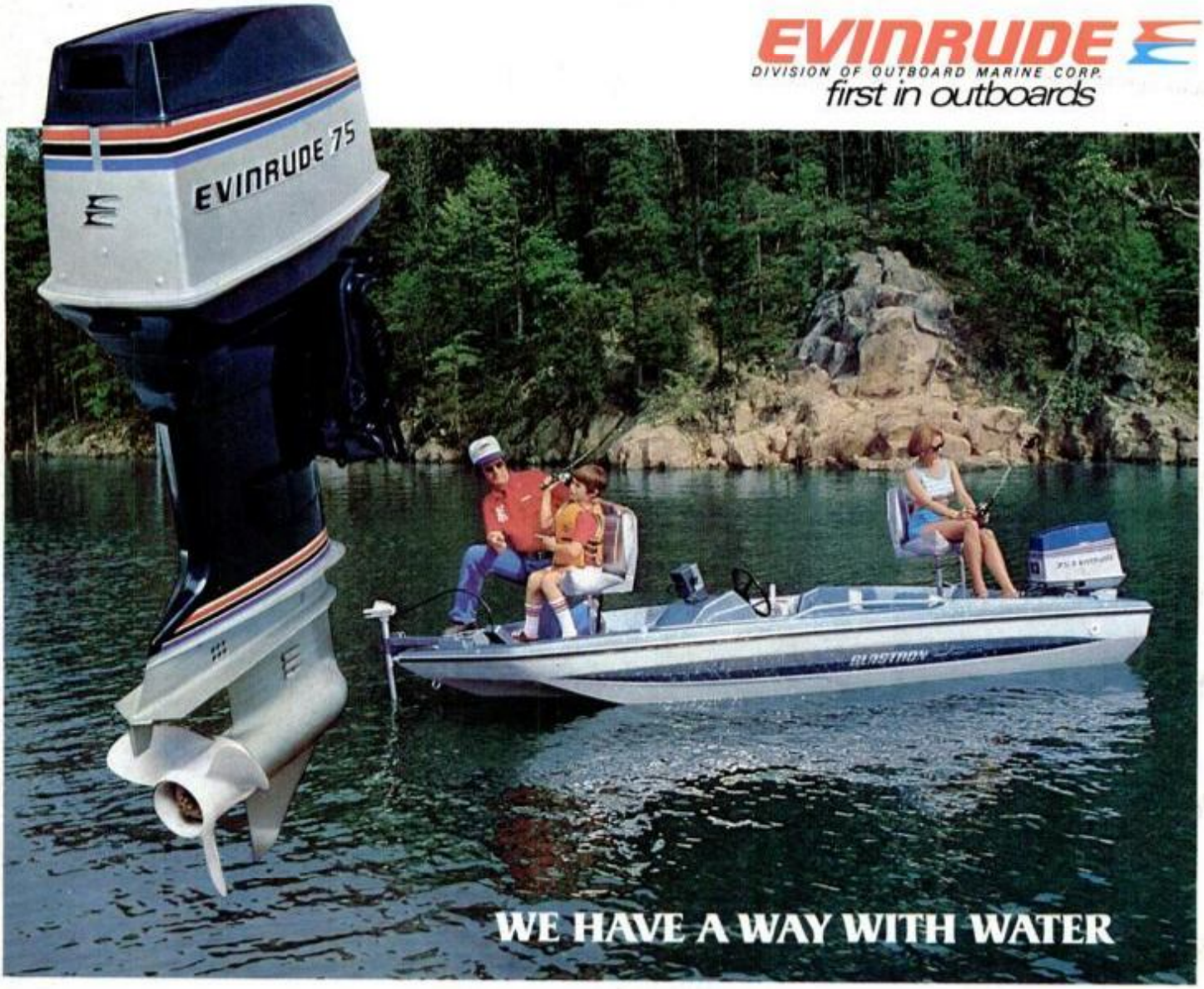
Why don't we at Evinrude do something about it?

Fact is, we have. We build bass motors that are as outstanding on the slalom course as they are on a fishing run. Compact, tournament-class V-4 fishing motors that are quick and strong enough for tournament-class skiing. Trim, efficient twins that fit the fishing needs of bass fishermen and the budgets of family boaters.

And motors like this high-performance Evinrude 75 that combine much of the best of each.

Just the thing for liberating a bass, or a lass.

EVINRUDE
DIVISION OF OUTBOARD MARINE CORP.
first in outboards



WE HAVE A WAY WITH WATER

Материал, защищенный авторским правом